See our super raised-panel jig! Details on page 34

Better Homes and Gardens®

WOOD®

THE WORLD'S LEADING WOODWORKING MAGAZINE

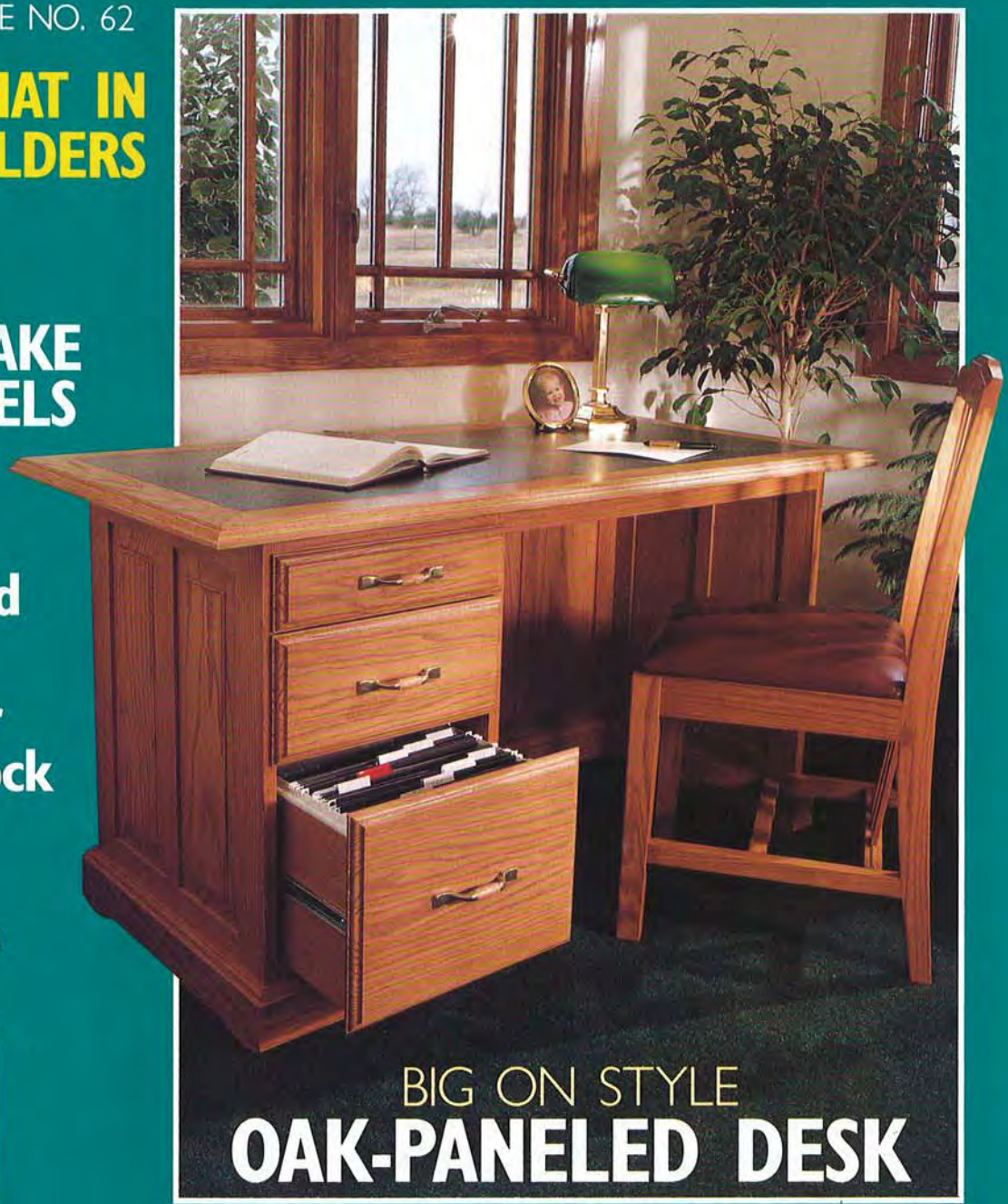
AUGUST 1993 • ISSUE NO. 62
Please display until August 11

WHAT'S WHAT IN PLANER/MOLDERS
Page 62

TECHNIQUE

HOW TO MAKE RAISED PANELS

SUMMER SIZZLERS
- Cutting board
- Dragon toy
- Letter holder
- Seafarer's clock
- Wall lantern
- Carved hound dogs



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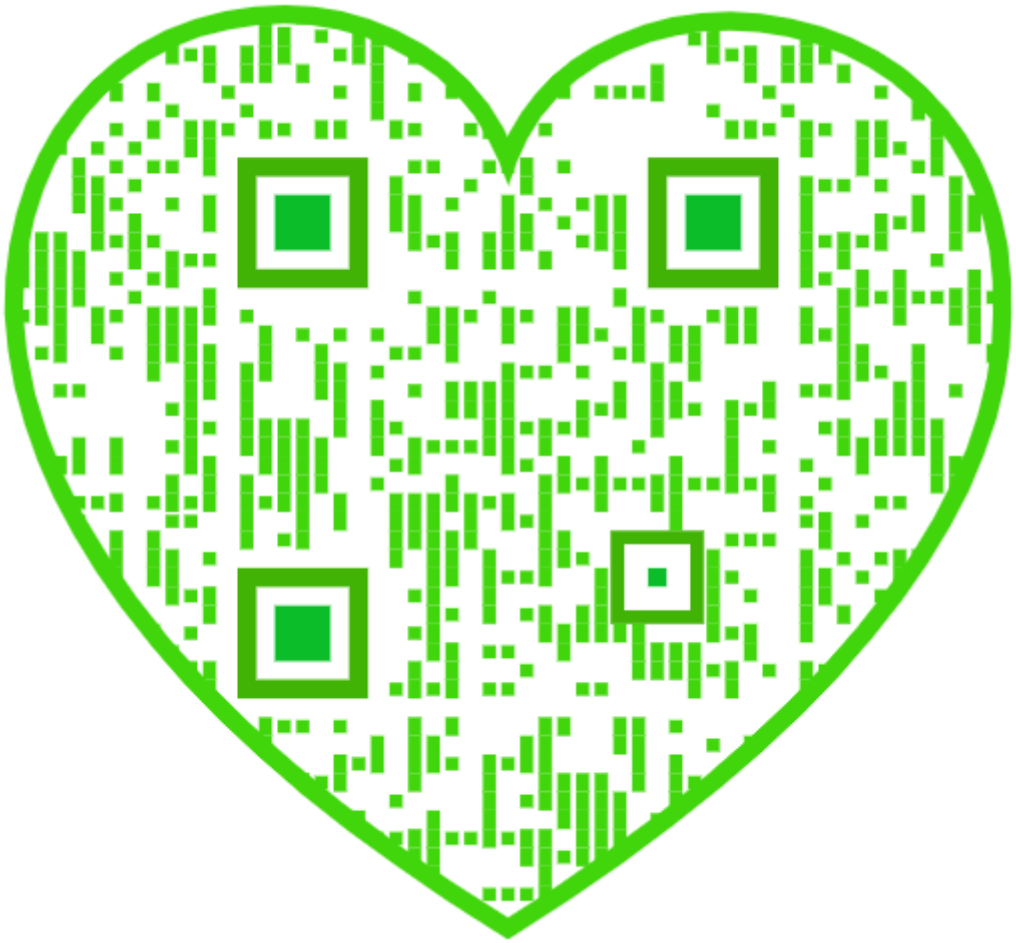

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THE EDITOR'S ANGLE

Wow! 12 YEARS OLD AND ALREADY AN ACCOMPLISHED WOODWORKER

The first time I saw the photo shown at *right*, I couldn't believe my eyes. It was hard for me to imagine how someone so young could have enough ambition, not to mention courage, to take on a project that is larger than he is. But that was before I read the following letter:

Dear sirs:

My year in 4-H has been very exciting, and I wanted to write and tell you all about it. My name is Jason Bittel, and I'm 12 years old. Woodworking is one of my favorite areas in 4-H, and my dad is our leader.

While I was trying to decide what to build for my 4-H project for the state fair, my mom found your magazine at the grocery store. The pie safe on the cover of the August, 1992 issue caught her eye. She had wanted a pie safe for several years.

She brought the magazine home and asked if I could build it. At first, my dad thought the project was too complicated for me. But when we started studying how the project was described and how well the drawings were done, I decided to try it.

It did take me some time. I work slowly since I'm just learning. But I completed the pie safe in time for the Polk County Fair in Oregon. It was given the championship for woodworking and was chosen to go on to the Oregon State Fair. To my surprise, I also won the championship there. I could not have done this without your help, and I wanted to tell you 'thanks.'

Photograph: Alan Bittel

Twelve-year-old Jason Bittel and his prize-winning pie safe.

I don't know about the rest of you, but I'm really impressed with Jason's craftsmanship. His pie safe looks every bit as nice as the one we built right here in the shop. Congratulations on your fine achievement, Jason—very few people your age could accomplish what you've done.

Check out our new index

We just completed our long-awaited *WOOD Cumulative Index* covering the first 60 issues. That's an entire library of project plans, techniques, and terrific woodworking features! To get your copy, see our ad on *page 87.*

Larry Clayton

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This issue's cover wood grain: bird's-eye white ash *Cover photograph: Wm. Hopkins*

AUGUST 1993 ISSUE NO. 62

WOOD PROFILE

Tupelo: the wood that pioneer lumbermen left alone 25

Though the early settlers shunned this wood, today's manufacturers rely on it for paper pulp, boxes, crates, and even furniture.

CRAFTSMAN CLOSE-UP 27

Travel to Brainerd in Minnesota's lakeland, and you'll likely see the colorful handiwork of custom signmakers Brent and Carol Manley along the way.

TURNING

Seafarer's clock 32

Set sail for a real turning adventure with this handsome ticker. Contrasting maple strips in a round teak frame help mark the time.

High-and-mighty tablesaw jig 34

Cut bevels and slots in the edges of wide, unwieldy workpieces using the sturdy, precision-oriented jig featured here.

SHOP-TESTED TECHNIQUES

Always-in-style raised panels and frames 36

Try out our jig design from the previous story to make flawless traditional raised panels and frames. We'll show you how.

NOW YOU CAN BUILD IT

Down-to-business oak desk 42

Work at home in comfort behind this accommodating home-office showpiece. It features raised-panel construction and ample storage.

Woodworking as a business 48

What's involved in selling the wooden things you make at crafts fairs and elsewhere? Find out from an expert who has written a book on the subject, as well as from previously featured craftsmen.

CRAFT SHOP
One-stop chopping 52
This meat-cleaver cutting board includes a knife-holding slot and looks great just hanging on a kitchen wall when not in use.

54
Give your little Lancelot or Guinevere this friendly serpent and personalize it with his or her name.

Superstamp letter holder 56
This desktop parking place for envelopes and bills can be scrollsawed out in an evening, using the full-sized pattern inside.

CARVING
Carve a couple of houn' dawgs 58
Check out the five-step process described here for whittling a good-natured pair of pooches. You'll be doggone glad you did.

TOOL BUYMANSHIP
Multipurpose planer/molders 62
Planing, sanding, molding, and ripping round out the versatility of these heavy-duty shop machines. While they excel at production work, they can save valuable work space and money.

Craftsman-style wall lantern 69
Build this unique arts-and-crafts outdoor light. Our plans tell how to mount it on your house or to a walkway post.

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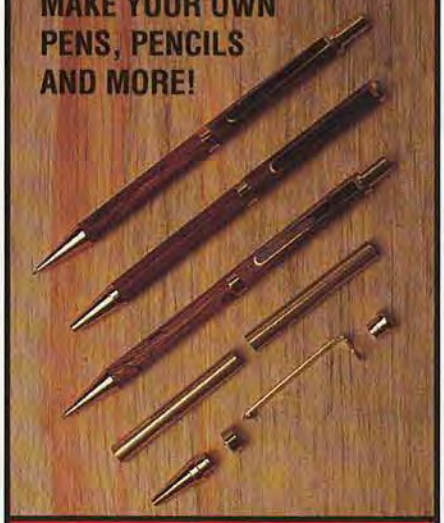

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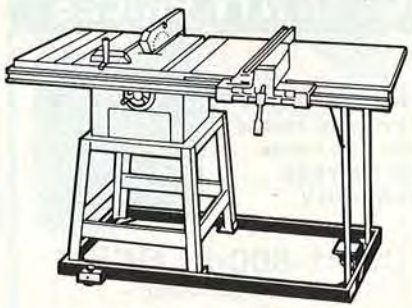

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TALKING BACK

Print this article

We welcome comments, criticisms, suggestions, and even compliments. Send your correspondence to: Talking Back, Better Homes and Gardens *WOOD* Magazine, 1912 Grand Ave., Des Moines, IA 50309-3379.

Jointing cuts sanding in half

The "Woven-Wood Clothes Hamper" in your January 1993 issue really caught my eye. However, when I visualized all the strips to be sanded, I dismissed the idea as too much work. Then an idea popped into mind. Before ripping each strip, I'd run the stock over the jointer, then rip. This gave me one very smooth surface for each strip and sanding was cut almost in half. After ripping all of the weaver strips, I mounted them on a carrier board using double-faced tape and ran them through my drum sander. Worked great!

—Raymond Babcock, San Angelo, Texas.

Piping for shop vacuum needs grounding

Your [Tips From Your Shop] article, "Piping for Your Shop Vacuum" in issue 50, gave me concern about the lack of grounding for static electricity. Shouldn't a bare wire run through the length of the piping and be grounded?

—Daniel Simmons, Fond du Lac, Wis.

Correct, Daniel. Any bare wire anchored at one end of the PVC and grounded at the other will prevent static electricity from building up.

Pivot arm rids underfoot cords

I have always tried to eliminate potential safety hazards. So when I built my shop, I put duplex outlets on each alternate stud on all four walls to eliminate the need for extension cords. However, this wasn't enough. Some tools ended up in the middle of the floor along with the necessary extension cord. So, in the center of the building, I built a pivoting arm with a single electric outlet. A simple 2x4″ mounted with a bolt to the ceiling joist works. Now, when I use a portable power tool, the electric cord stays overhead and out of my way.

—Robert Furr, Fredricksburg, Va.

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CAD works for him

The handiest tool in my woodworking shop is my personal computer with my Computer-Assisted Drafting (CAD) program. I discovered CAD at my office and now teach [the use of] it at a community college. I'll bet a lot of your readers have access to a computer with CAD at work or in their home. Here are just a few of the woodworking problems CAD has helped me solve.

First, it helped me create an artful wood sign using computer fonts for the lettering. (After this, I printed out a full-size pattern.) Second, I designed a quick-cutting pattern for rafters in my garden shed. Third, I found I could optimize my shop layout on the computer screen. And finally, I determined how to make the most efficient cuts from stock by using the easy-to-use cutting diagram program.

—Dan Tonjes, Milford, Neb.

Monster Truck is best of show

I was looking for a project to enter in the Georgia National Fair and your "Monster Truck" (issue 35) designed by Edward Dohm fit the bill. However, I felt the design deserved a better wood than pine so I used walnut and maple and added on a few extra features. I also enlarged the plans by seven percent. This project not only won the blue ribbon in its category, but also the Best of Show. Thanks to Mr. Dohm's design and *WOOD* magazine.

—Jim Fodor, Warner Robins, Georgia.

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Continued on page 8

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TALKING BACK

Continued from page 7

Clock movements change hands

In the January 1992 issue, we presented the Shaker-style wall clock with the movement and hardware from Mason Sullivan. However, the company has discontinued supplying that particular clock movement, along with the hands, dial, Shaker peg, hinges, and catches, as listed in the Buying Guide at the end of the article. But, we have a new source for all of the hardware: Turncraft Clocks, P.O. Box 100W, Mound, MN 55364-0100. To order, request kit no. 6401. It costs $29.95 plus $4.95 shipping from the above address, or call 800/544-1711 to order.

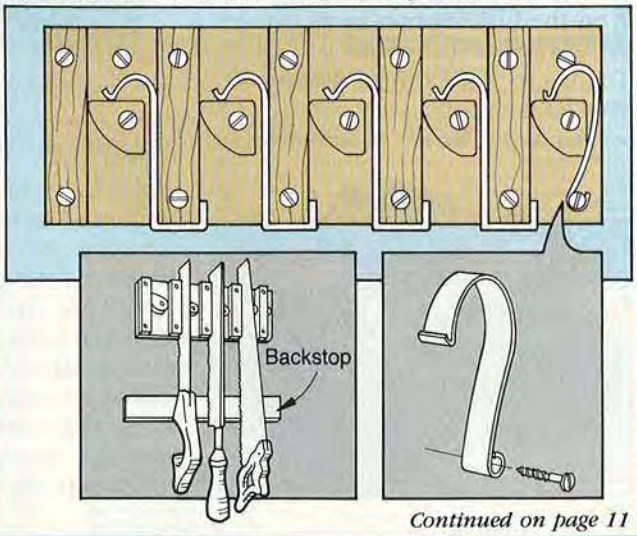
Steel bands make cams "grab"

Your saw-rack plans in issue no. 57 inspired me to make them for Christmas presents for my sons and sons-in-law. But in trying the finished product out, I found that the cams, even though they turned freely, sometimes hesitated to grab the saw. To solve this occasional flaw, I made some springs out of ½" steel bands such as those used in shipping lumber, etc. (free for the asking at most lumber yards). I split the bands lengthwise into ¼" strips and shaped them as illustrated. The right-hand spring needs a wire nail to hold it in place (one to hold the spring in position and one for the spring to pivot against).

I also noticed that the saws could tend to swing in and unlatch. So I placed a backstop on the wall about 14" down from the holders.

—Ken Albert, Sioux Falls, S.D.

Your additions make sense to us, Ken. Thanks.



Continued on page 11

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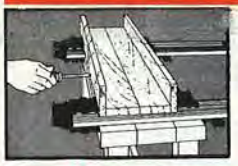

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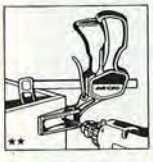

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TALKING BACK

Continued from page 8

High marks for our new tool rating system

I just read the December issue of *WOOD* and wanted to tell you that the new rating system for tool testing is great—exactly what was needed. I appreciate the reviews and base a lot of my purchases on them. In fact, I wish I would have waited for your biscuit-joiner review.

—Dan Alter, Ft. Wayne, Ind.

Tool photos mixed up

Delta's model 7441 finishing sander and Black and Decker's model 7463 variable-speed Powerfile are shown below. *The Top Shop Tip prize for issue 61 contained a photo of the Delta grinder/finisher. That's the prize for this issue's winner.*

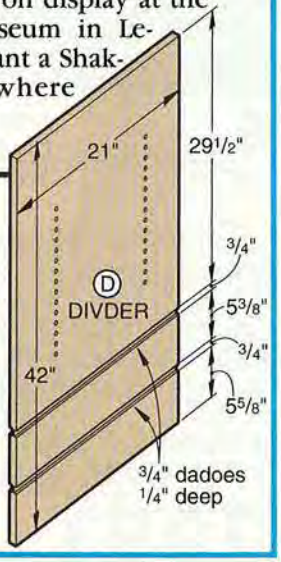
Shaker dresser is actually a chest with cupboards

Good to hear that you plan to offer more plans featuring Shaker furniture. However, I thought you might like to know that the Shaker dresser in your October 1992 issue is actually a chest with cupboards. Unless I miss my guess, your "dresser" was from a measured set of plans from the Old Chatham Museum in New York. I point this out because the Shakers did make dressers in the form of one-drawer to three-drawer blanket chests. The Shaker craftsmen finally designed a true chest of drawers in 1827. That chest is on display at the Warren County Historical Museum in Lebannon, Ohio. If you really want a Shaker chest of drawers, that's where you'll find it.

—Wayne Hensley, Blacksburg, Va.

Shaker tall-chest update

Note this correction in our Shaker tall-chest plans (or, chest with cupboards, if you prefer) in the October 1992 issue, page 37: *The bottom dimension on the divider drawing should be 5⅝", not 5⅜" as listed. The overall measurement of the divider (D) is correct.*



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*See *Fine Woodworking*, July/August, 1991, pg. 59

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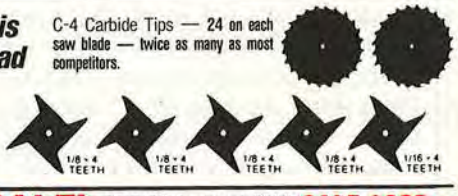

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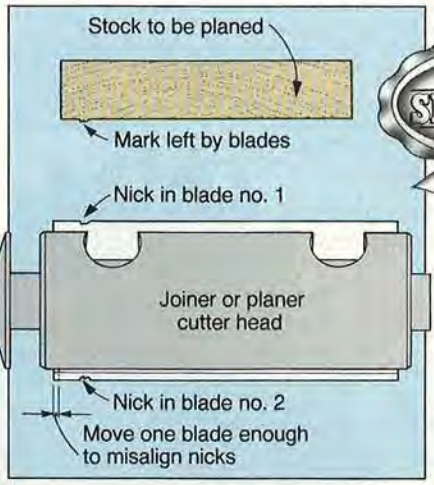
Slide to side eases nicked-knife grief

AARGH! A ridge on the board! Something has nicked your thickness-planer or jointer knives. You have a few more pieces to plane, no spare knives, and the sharpening shop is closed for the weekend. Are you just out of luck?

TIP: You can still complete that project. Move one of the knives 1/16" or so to one side, and carry on with the job. By offsetting the nicks on the blades, your stock comes out clean.

–Gary Miller, Peek, Minn.


Stock to be planed
Mark left by blades
Nick in blade no. 1
Joiner or planer cutter head
Nick in blade no. 2
Move one blade enough to misalign nicks

For his tip, Gary receives a Delta model 23-675 6" bench grinder and 3×24" belt sander, shown *right*.

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We try not to use shop tips that have appeared in other magazines, so please send yours to only one. *We do not return shop tips.* Mail your tip(s), address, and daytime phone number to:

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1912 Grand Ave.
Des Moines, IA 50309-3379

Open the door to convenient clamping

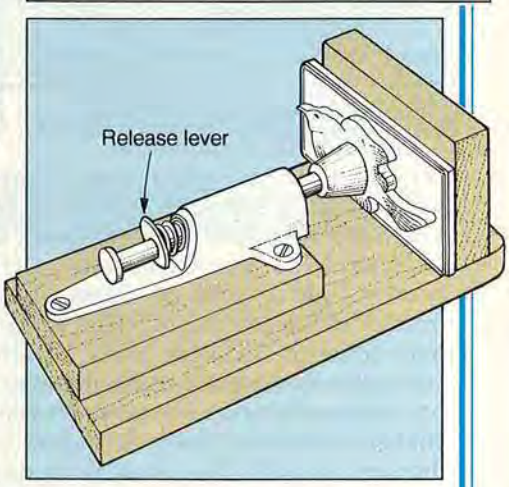
You start to feel awfully clumsy when clamping small pieces, what with trying to hold the clamp, the pieces, and the protective pads while turning the clamp screw.

TIP: This light-duty clamp sits on the bench to take the pressure off you and put it on the work where it belongs. It does the job without clamp screws because it's really a quick-release doorstop.

To build the jig, assemble a frame of ¾"-thick scrapwood like the one shown *right*. (Select dimensions to meet your own needs.) Then, mount the doorstop where shown. (Build one with multiple doorstops for larger work.) To clamp, simply push the plunger to press the workpiece against the back of the jig. To release, push the lever toward the doorstop body.

You also could adapt doorstops to secure work on a drill-press table, miter box, or other equipment. Hardware stores and home centers sell the doorstops.

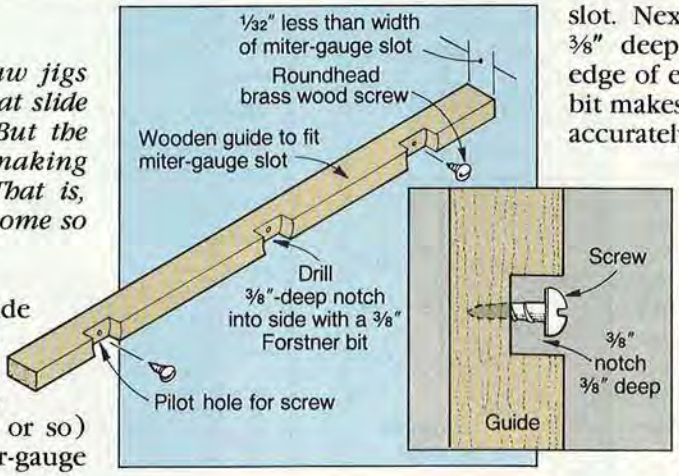
–Lloyd Prailes, Boulder Junction, Wis.



Brass screws solve sticky saw situation

Many shop-made tablesaw jigs employ hardwood strips that slide in the miter-gauge slots. But the strips sometimes swell, making them bind in the slots. That is, unless they shrink and become so loose they affect accuracy.

TIP: Adjustable-width guide strips will end the problem. To make them, start with a hardwood strip slightly narrower (by 1/32" or so) than the width of the miter-gauge slot. Next, cut a ⅜"-wide notch ⅜" deep every 3–4" along one edge of each strip. (A ⅜" Forstner bit makes the notches quickly and accurately.) Center a pilot hole in each notch, and drive in a #6×½" roundhead brass wood screw. (Don't use steel screws; they could cause the slots to wear excessively.) Now you can adjust the guide-strip for fit by turning the screws in or out.


1/32" less than width of miter-gauge slot
Roundhead brass wood screw
Wooden guide to fit miter-gauge slot
Drill ⅜"-deep notch into side with a ⅜" Forstner bit
Pilot hole for screw
Screw
⅜" notch ⅜" deep
Guide

–Jerry Miller, Ringwood, N.J.

Continued on page 14

Craftsman's New Radials Industry Leaders Any Way You Cut It.

Dave,
See my notes.
Wow! I'm impressed with the stability of the carriage assembly. Like the new wide track design and double yoke.
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Contractor Series
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Terrific! Adjustments look easy.
Great! I see you have patent pending on new internal booted motor switch.
New guard is great. Obviously best in the industry.
Great job!
Roger

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 12

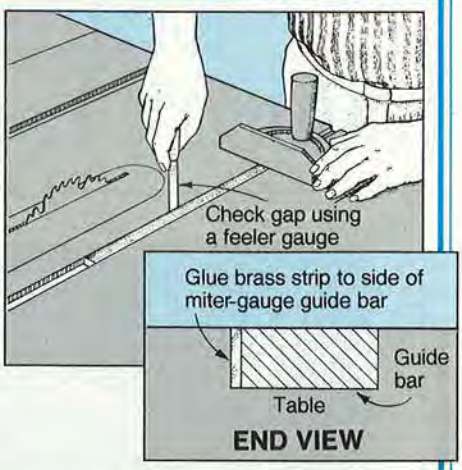
Brassy solution for a sloppy miter gauge

Your miter gauge fits loosely into the table slot. This side play affects the accuracy of your cuts.

TIP: Put your miter gauge back into the groove with a snug-fitting guide bar. First, measure the amount of play with feeler gauges, available from auto-supply stores. Slip different gauges into the gap between the miter-gauge bar and the side of the slot until you find one that minimizes play yet still allows the bar to slide.

Then, from brass stock of that thickness, cut a strip to fit the side of the bar. (Buy thin brass shim stock from a hobby shop or auto-supply dealer.) Bond it to the side of the bar with cyanoacrylate adhesive. Polish and wax the bar.

—Mel Morabito, Mahopac, N.Y.



Get right to the point when sharpening an awl

When sharpening an awl (or a center punch), it's all too easy to make the tip look more like a faceted diamond than a smooth, pointed cone.

TIP: Form a perfect tip with this jig made from 1½ × 1½ × 2″ scrapwood. To make one, drill a hole 1/64″ larger than the tool's shaft diameter lengthwise through the stock. Bandsaw or scrollsaw the opening shown. Glue nonskid material onto the bottom.

To use, insert the tool, set the jig at the proper angle to a belt or disc sander, and rotate the tip against the moving abrasive, holding the jig with your other hand. Maintain drag by pressing a finger against the tool shaft.

—Jay Wallace, Ashland, Ore.

Continued on page 17

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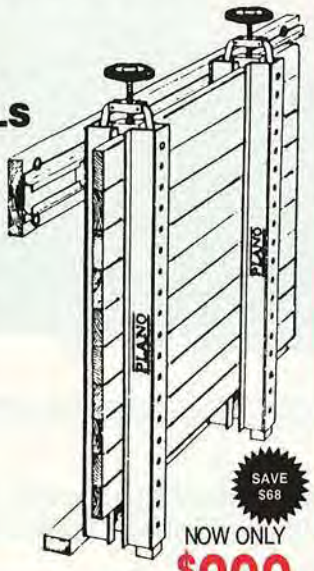

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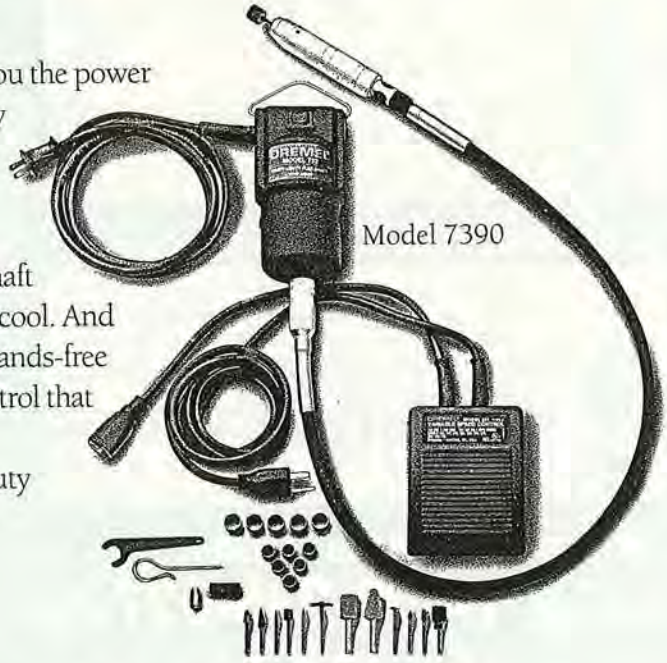

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C1069	1/2"	1/2"	1-3/4"	14°	$5.00
C1071	3/4"	11/16"	2-1/8"	14°	$7.00

1/2" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	ANGLE a	PRICE
C1074	1/2"	1/2"	2-1/4"	14°	$5.00
C1076	3/4"	3/4"	2-1/2"	14°	$8.00

COVE BITS 2 Flutes with Bearing Guide

1/4" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	RADIUS r	PRICE
C1141	1"	1/2"	2"	1/4"	$12.00
C1143	1-1/4"	5/8"	2-1/8"	3/8"	$14.00

1/2" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	RADIUS r	PRICE
C1147	1"	1/2"	2-1/4"	1/4"	$12.00
C1150	1-1/8"	5/8"	2-1/2"	3/8"	$14.00

ROUNDOVER BITS with Bearing Guide

1/4" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	RADIUS r	PRICE
C1175	7/8"	3/8"	2"	1/8"	$10.00
C1177	1"	1/2"	2"	1/4"	$11.00
C1179	1-1/4"	5/8"	2-1/4"	3/8"	$14.00

1/2" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	RADIUS r	PRICE
C1184	1"	1/2"	2-1/4"	1/4"	$11.00
C1185	1-1/8"	1/2"	2-3/8"	5/16"	$12.00
C1186	1-1/4"	5/8"	2-1/2"	3/8"	$14.00

ROMAN OGEE 2 Flutes with Bearing Guide

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PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	RADIUS r	PRICE
C1153	1-1/8"	1/2"	2-1/16"	5/32"	$16.00
C1154	1-1/2"	3/4"	2-1/4"	1/4"	$18.00

1/2" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	RADIUS r	PRICE
C1155	1-1/8"	1/2"	2-1/4"	5/32"	$16.00
C1156	1-1/2"	3/4"	2-1/2"	1/4"	$18.00

CLASSICAL BITS with Bearing Guide

1/4" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	CUTTING WIDTH W	PRICE
C1289	1-1/4"	5/8"	2-1/8"	3/8"	$25.00
C1290	1-1/2"	3/4"	2-1/4"	1/2"	$25.00

1/2" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	CUTTING WIDTH W	PRICE
C1291	1-1/4"	5/8"	2-3/8"	3/8"	$25.00
C1292	1-1/2"	3/4"	2-1/2"	1/2"	$25.00

SOLID CARBIDE SPIRAL 2 Flutes

1/4" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	PRICE
C1441	1/8"	3/8"	2"	$15.00
C1442	3/16"	5/8"	2"	$15.00
C1454	7/32"	3/4"	2"	$19.00
C1443	1/4"	3/4"	2"	$15.00

1/2" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	PRICE
C1559	5/16"	7/8"	3"	$25.00
C1446	3/8"	1"	3"	$30.00
C1447	1/2"	1"	3"	$30.00

Due to the nature of solid carbide, these bits are not warranteed against breakage.

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PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	PRICE
C1001	1/4"	3/4"	2"	$6.00
C1002	5/16"	11/16"	2"	$6.00
C1003	3/8"	3/4"	2"	$6.00
C1004	1/2"	3/4"	2"	$8.00

1/2" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	PRICE
C1008	1/4"	3/4"	2-1/2"	$6.00
C1009	5/16"	3/4"	2-1/2"	$6.00
C1010	3/8"	3/4"	2-1/2"	$6.00
C1011	1/2"	1-3/16"	2-1/2"	$8.00

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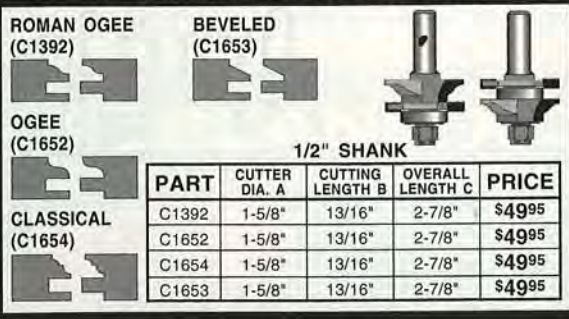

1/2" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	PRICE
C1392	1-5/8"	13/16"	2-7/8"	$49.95
C1652	1-5/8"	13/16"	2-7/8"	$49.95
C1654	1-5/8"	13/16"	2-7/8"	$49.95
C1653	1-5/8"	13/16"	2-7/8"	$49.95

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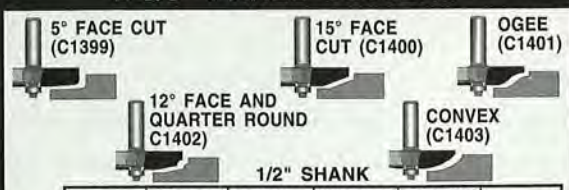

1/2" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	CUTTING WIDTH W	PRICE
C1399	2-5/8"	1/2"	2-1/4"	1-1/16"	$29.95
C1400	2-5/8"	7/16"	2-1/4"	1-1/16"	$29.95
C1401	2-5/8"	9/16"	2-1/4"	1-1/16"	$29.95
C1402	2-5/8"	7/16"	2-1/4"	1-1/16"	$29.95
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TIPS FROM YOUR SHOP (AND OURS)

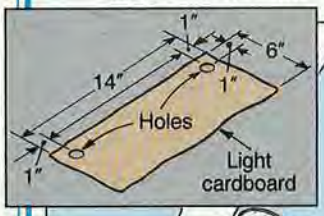
Continued from page 14

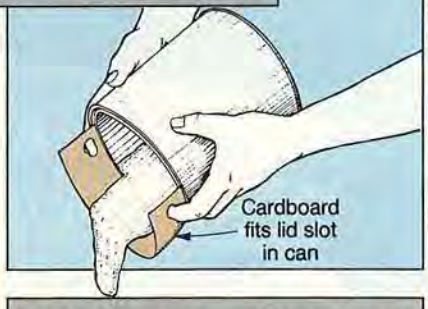
Cardboard sanitizes messy paint pouring

Pouring paint or other finishing materials from a can practically guarantees a mess.

TIP: Reduce the dribbles and drips with a simple paint-can spout. Just cut a pair of ¾"-diameter finger holes where shown on a 6×14" piece of cardboard. Then bend the cardboard into an arc and slip it into the lid groove around the top of the can. Hold the spout in place with a finger through each hole, shown *below*, as you pour.

–Darin Botts, Bloomington, Minn.





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- Have a cabinet or tabletop that could use some pizzazz? Plastic laminate can help. See how we used it on *page 45*.
- Masking tape works great for holding mitered projects together while the glue dries. And, it keeps the glue from squeezing out. See how we taped the frame pieces for the outdoor light on *page 71*.

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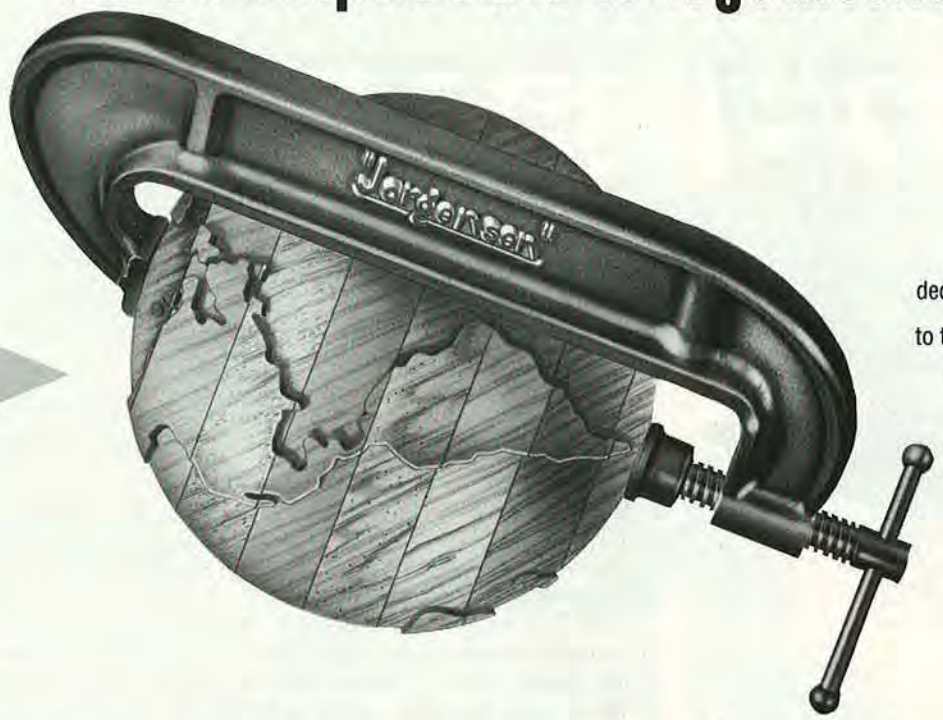

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ASK WOOD

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What are the metric conversions for wood?

At a woodcarvers' meeting, several of us were talking about buying wood using the metric system. What is a board foot in metric? How is thickness measured? Does plywood come in metric sizes? Will we be converting to metric soon?

—J.N. Kase, Houston, Texas.

We talked to Tom Johnston at the National Hardwood Lumber Association, Memphis. Tom said that the metric system is increasingly finding its way into the American lumber industry. Jim Kahler of Paxton Lumber Company in Des Moines concurs: "Most plywood now comes in thicknesses of millimeters, not the old standard fractions of inches. Slowly, the industry is shifting."

Johnston says, "While we are seeing more metric use, no standards of conversions have been set or adopted by the American lumber industry." And, Kahler adds, "It is not clear to me what should be used for the most basic standard of measurement. While consensus exists, our foreign buyers now order lumber in cubic meters (not board feet.)"

In the meantime, here are some common conversions to keep in mind for your next meeting:

Metric Conversion Table
1 millimeter equals .0394 inches (3/64")
1 centimeter .3937 inches (25/64")
1 meter equals 39.37 inches (39 3/8")
1 inch equals 25.4 millimeters
1 foot equals 3.048 decimeters
1 yard equals .9144 meters
Lumber conversions
1 cubic meter equals 424 board feet
1 board foot equals 2,359 cubic centimeters
Plywood conversions
6 mm or 15/64" or 1/64" less than ¼"
12 mm or 15/32" or 1/32" less than ½"
18 mm or 45/64" or 3/64" less than ¾"

Continued on page 20

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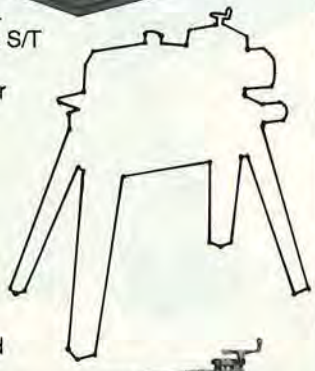

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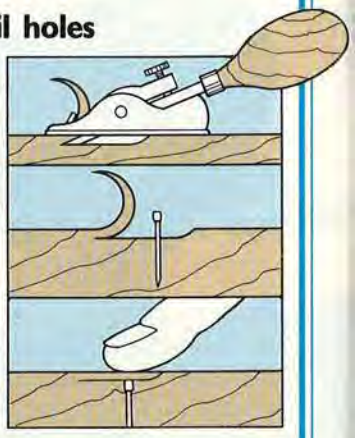
ASK WOOD

Continued from page 19

Hide those unsightly nail holes



I've had problems filling nail holes with both wood filler or plastic wood. When I stain after filling, the nail holes are always darker than the rest of the wood. (I work with mostly pine.) Dark nail holes can ruin a good project. What should I do to correct the problem?

—Bill Harper, Sandstone, Va.

Two filler products you might try, Bill, are Fix Patch Wood and Durham's Rock Hard putty. According to WOOD *magazine Project Builder Jim Boelling, both do well on pine. And you can find them at hardware stores and homecenters.*

To get around using fillers, try out a special tool called a blind nailer. This tool will lift a chip from the board surface where you intend to sink a nail. Then, once the flap is created, tap in your brad or nail, and then glue the chip back down with fish glue—a super tacky glue that holds the flap without the need for clamps. You can order a blind nailer and fish glue for $19.95 through The Garrett Wade Tools Catalog, 161 Avenue of the Americas, New York, NY 10013. Or call 800/221-2942.

Glue problems have him stuck

Since woodworking for me is only a hobby, I do not consume a lot of glue. I have had trouble with aliphatic resin glue wetting the surface properly; it seems to ball up in the same way rubber cement would. I have tested the bonding strength and it seems to be okay. Am I doing something wrong? Can I add water to make it flow and wet the surface better? Does this type of glue have a shelf life? Is there a better way of storing it?

—P.W. Mason, Cincinatti, Ohio

Lots of good questions, P.W. First of all, "you can add water to aliphatic resin glue—up to 5 percent of its weight without losing bonding strength," says Derick Cooper, assistant products manager for Franklin International, manufacturers of Titebond and other glues. However, only add water if the glue appears thick. If your glue balls up, adding water won't help and there is nothing you can do. The glue may be too old. Most glues have a shelf life of two years. "Although," Cooper says, "you can increase that shelf life by storing the glue in an air-tight glass container." That means actually pouring your glue from the plastic container it comes in, into a glass jar (a mayonnaise jar works fine) and sealing it using a metal lid with a rubber seal.

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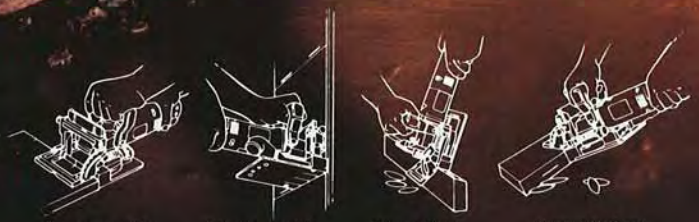

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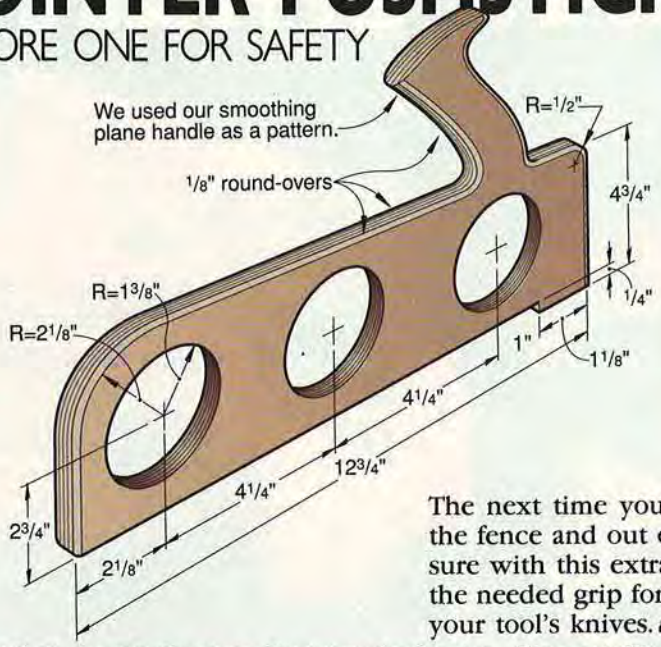

The next time you're jointing wood, keep your hand safely above the fence and out of harm's way while applying even "down" pressure with this extra-tall pushstick. A notched bottom edge provides the needed grip for pushing the wood smoothly and effectively over your tool's knives.

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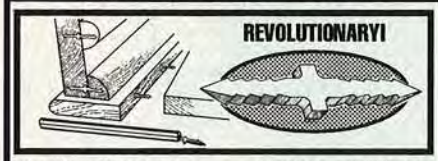

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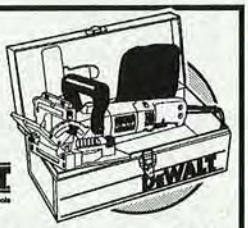

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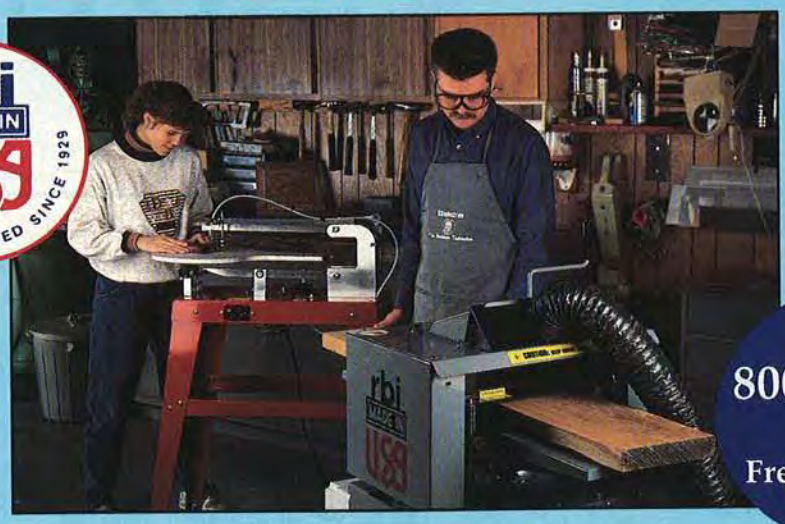

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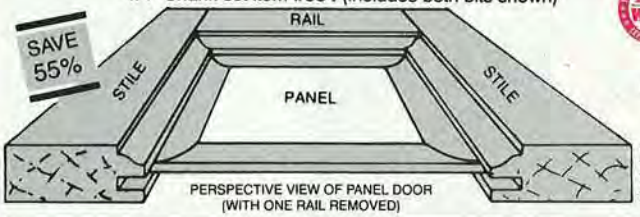
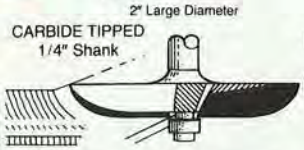


PERSPECTIVE VIEW OF PANEL DOOR (WITH ONE RAIL REMOVED)

RAISED PANEL BIT SUPPLIED WITH BALL BEARING



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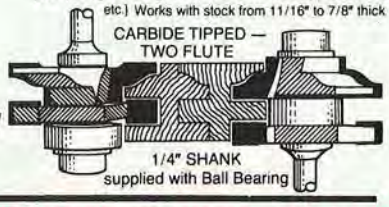

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#558		Thumbnail		1 3/16"	3/8"	1/4"	$18.50
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TUPELO

The wood that pioneer lumbermen left alone

In frontier America, much practical woodworking was done with an ax. If a tree couldn't be felled, bucked, and easily split with that one implement, it was left alone. Another more compliant specimen was harvested instead. That was why tupelo was at first shunned.

The tupelo tree grew throughout a wide range, but the hard wood with its interlocking grain was terrrible to split. And unlike chestnut and oak, which could be air-dried successfully, tupelo wood twisted and buckled. So even commercial lumbermen avoided it.

Then, just before the 20th century arrived, a keen-eyed wood seller saw opportunity. The same tough qualities that made tupelo a logger's nightmare made the wood a superior material for workbenches, factory floors, and school furniture—anything that had to resist abrasion and splitting. Today, while most tupelo harvested goes for paper pulp, boxes, crates, and plywood cores, some winds up in the furniture industry. There, tupelo wood becomes chairs, cabinets, and store fixtures.

Wood identification

Tupelo has many names. Pepperidge, swamp tupelo, cotton gum, bay poplar, and black gum all apply. Basically, though, there are only two kinds of tupelo: black tupelo (*Nyssa sylvatica*) and water tupelo (*Nyssa aquatica*). The commercial timber trade doesn't differentiate between them.

Black tupelo has the widest range, growing in lowlands where the ground is moist (*nyssa* means water nymph). Water tupelo prefers it even wetter in its limited range along the Gulf and in the Mississippi River bottoms (shown *above* by darker shading).

Of the two, water tupelo reaches a greater height (80–100′) and diameter (3–4′). Both trees have reddish-brown bark, but that of black tupelo forms irregular ridges while water tupelo's appears scaley. The leaves of the two trees share the same oval shape, but those of water tupelo are normally larger. Each produces clusters of purple berries sought by wildlife.

Light yellow to tan in color and without significant figure, the wood of tupelo weighs from 25 to 45 pounds per cubic foot air-dry, depending on its origin. The lighter-weight wood comes from the water tupelo.

Natural range

While tupelo rates as moderately stiff, strong, and hard, it's also brittle. Wood cut from the enlarged buttresses of water tupelo tends to be softer and lighter, although no less brittle.

Tupelo's fine-textured, uniformly grained wood primarily comes from the tree's proportionately large amount of sapwood. Only edge bands of gray heartwood sometimes appear.

Uses in woodworking

Today's wooodworker can look to tupelo for longwearing furniture, cabinets, table and bench tops, natural and painted millwork, and turnings. Carvers find the softer, fine-grained wood of water tupelo perfect for details.

Availability

In regions where tupelo is commercially sawn, it's sold for $1.50 per board foot or less. Out of its natural range, tupelo lumber would be available only by special order through traditional outlets, although at a price less than yellow poplar, for example. Veneer isn't sold. You can, however, special order tupelo turning squares and carving blocks.

Continued

PERFORMANCE PROFILE

tupelo

(Nyssa sylvatica, aquatica)

Tupelo

Although generally rated as no harder than black cherry, some black tupelo might surprise you with a toughness that matches hickory and requires power tools. A water tupelo board, though, may be as easy to work with hand tools as yellow poplar. Asking the seller about the wood's origin should give you a clue and possibly eliminate any surprises.

As long as you buy thoroughly seasoned tupelo lumber—letting someone else deal with seasoning quirks—working the wood shouldn't pose special problems. And staining and finishing won't be affected. *Just pay attention to these reminders:*

Machining methods

- Because of tupelo's general hardness, carbide-tipped blades and other cutters become a must.
- The wood's brittleness requires feeding boards at a slight angle during planing.
- When ripping, remember to feed tupelo slowly, giving the blade time to throw out sawdust. This also avoids heat buildup, which causes burning.
- Taking lighter cuts on tupelo when jointing it results in smoother surfaces.
- Use slower drill-press speeds, spurred bits, and a backing board when drilling this wood. Occasionally raise the bit from the hole to reduce the problem of burnishing the wood. (Glue doesn't adhere well to burnished wood.)
- To lessen the chance of chipping during shaping, take only light passes with your router.
- Tupelo responds to all glues equally well, if you make sure that the jointing surfaces are exceptionally smooth.
- Avoid cross-grain sanding on hard tupelo because you'll find that scratches resist removal.
- Tupelo doesn't split easily, but its hardness requires predrilling for screws and nails.
- You'll be happy with the results from all types of stains and finishes on tupelo. The wood also holds all paint well, and its light color is perfect for stenciling.

Carving comments

Prior to the widespread use of inexpensive plastic floats on nets, ones carved of water tupelo served Gulf Coast fishermen for decades. And more recently, the wood has found great favor with realistic, decorative decoy carvers who rely on power equipment to remove wood.

- Begin with medium to light cutting burrs to power-carve tupelo. Otherwise the wood may chip.
- To carve the wood with hand tools, reduce the bevel on your gouges to 15°–20°.
- Tupelo holds details well, and burning tools easily make their mark in the wood.

Turning tips

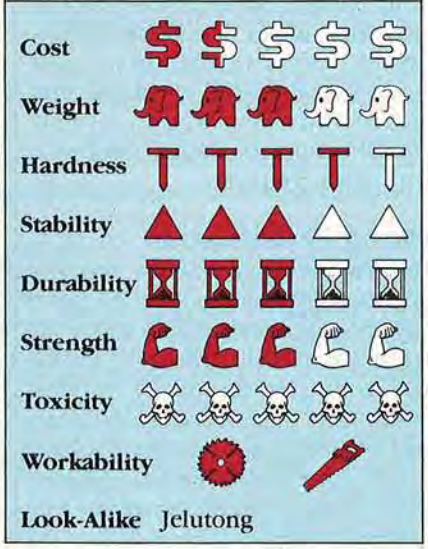
Tupelo has never proved popular with turners, except for practice. But if you want to give it a spin, make sure you turn only with sharp-edged tools to avoid tearing the interlocking grain.

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions—and special tips pertaining to this issue's featured wood species—appear under headings elsewhere on this page.

- For stability in use, always work wood with a maximum moisture content of 8 percent.
- Feed straight-grained wood into planer knives at a 90° angle. To avoid tearing, feed wood with figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about 1/32".
- For clean cuts, rip with a rip-profile blade with 24–32 teeth. Smooth cross-cutting requires at least a 40-tooth blade.
- Avoid using twist drills. They tend to wander and cause breakout. Use a backing board under the workpiece to reduce tearout.
- Drill pilot holes for screws.
- Rout with sharp, preferably carbide-tipped, bits and take shallow passes to avoid burning.
- Carving hardwoods generally means fairly shallow gouge bevels—15°–20°—and shallow cuts.

TUPELO AT A GLANCE



Compiled with woodworkers Ross Barker and John Arnes Illustrations: Steve Schindler

SignCrafters
Wood Sign Specialists

NORTH-COUNTRY SIGNS

In Minnesota's lake land, young signmakers Brent and Carol Manley offer attractive options to billboards and neon.

Print this article

Brainerd—it's the hub of central Minnesota's lake region. And local legend has it that the mythical logging giant Paul Bunyan and Babe, his equally huge blue ox, created the area's hundreds of lakes with their footprints. At least that's what poker-faced Minnesotans tell the summer tourists.

Continued

Who are strangers to argue the tale, though, when a multitude of billboards point the way to Paul Bunyan Land—an amusement park overseen by a 50'-tall statue of its namesake? More gigantic billboards lead them to numerous other non-fictional attractions, including motels and lakeside resorts, golf courses, restaurants, boat-and-bait houses, and souvenir shops. It's a tourist's heaven. And for Brent and Carol Manley, founders of a successful wooden-sign proprietorship they call Signcrafters, Brainerd is a signmaker's dream come true.

Plenty of signs mean good times

"Billboards are good and bad," sighs Brent Manley. "When you drive into Brainerd, there are billboards everywhere. I don't like the looks of them myself, all lined up along the highway. And we don't do them, but we recognize that billboards are a necessary part of the business around here."

Brent knows what he's talking about. At 32, he has devoted himself to the local sign business—and all that goes with it—for six years. That means that he and his wife, Carol, 27, not only design and make signs, but 75 percent of the time they're responsible for installing them, too.

And installation requires bonding and licensing from each of the townships and municipalities that they serve. Consequently, Brent and Carol need to keep up with all the local sign ordinances, as well as those of county and state.

Six years ago, though, things were different for the sign partners. Brent and Carol were barely scraping by a little farther north, in the resort town of Bemidji. Brent worked in a cabinet shop. Carol had just completed her degree work in graphic design at Bemidji State. It was natural to team up in a wooden-sign business.

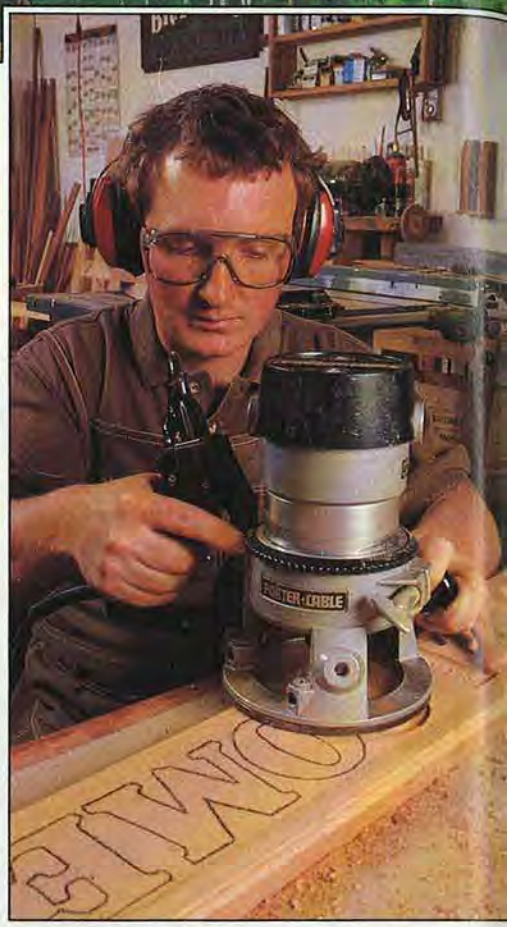
"Bemidji was a nice town," Brent comments. "But it doesn't have the market area of Brainerd. And there were already three sign businesses, all making the type of sandblasted signs we specialize in." So, rather than get involved in a bidding war for every sign, the couple decided to move.

But, with all the signs in evidence around Brainerd, isn't there a saturation point? "Here, there's always change," Carol responds. "I know of at least two businesses that aren't around this year that bought signs from us last year. There're always businesses changing hands. And along the line they change logos and names. The new owners want a different look. We know we're nowhere near to saturating the market."

"I'm not saying that every business should have one of our signs," Brent adds. "But there is a lot of room for improvement."

Good design sells signs

The Manleys mostly cater to referrals from pleased commercial cus-



▲ Although Brent's specialty is sandblasting, he's adept at freehand routing, too. Here he works on a cedar sign.

tomers. There are still some drop-ins, though. "We tag all our signs with a nameplate that has our logo and phone number,"says Carol, "so we do get follow-ups. We also send a brochure to a new business when we see their building going up, just to let them know we're here."

Few customers, however, know exactly what they want their sign to look like when they walk through the door. That's where Brent and Carol shine.

▲ On the usual sandblasted sign of redwood, the details must be created, then enhanced by hand with a flexible-shaft power carving tool.

◀ This SignCrafters' church sign along a main street in Brainerd exemplifies the compatible relationship between the sign and the means of mounting it. Brent builds tenons on the sign and cuts mortises in the posts.

"Our first emphasis with a sign is design," says Brent. "Because with signs—unlike a lot of other things—you can have poor workmanship, but if you have a good design with good colors, it still comes across as a halfway decent sign. On the other hand, if you have super-quality craftsmanship with a lousy design, you won't have an effective sign. We have to show the customers that we offer both craftsmanship and exciting design as well."

Price naturally comes up in customer conversations. And to the uninitiated, the reality is a shocker. "We pretty much quote a figure based on $50 to $60 per square foot," explains Brent. "That sends lots of folks out the door. But if it doesn't, we then can agree on a rough design," adds Carol, "and scale it out to the size they want—and what zoning will allow us to do."

"From there, we can add details, at additional cost, such as multiple designs, carved images, and gold leaf. Plain, bold letters will be on the lower end of the price scale, and lots of details on the higher end. We've done signs that cost $70 per square foot."

"Then, of course, comes longevity," Brent chimes in. "We tell our customers that our sandblasted signs will last from six to eight years with only minimal maintenance, such as dusting and washing. So far, that hasn't been an unfounded claim."

Sticking with proven weather-fighting wood

What wood can stand up to the elements of a north-central Minnesota winter? The same wood many folks select for lawn furniture and other outdoor projects: California redwood. Of course, western red cedar, cypress, and even teak would hold up, too. Yet, Brent has some pretty sound reasons for choosing redwood.

"Redwood tends to be more stable for sandblasted signs than the other common alternative, red cedar," the signmaker explains. "Too, redwood, especially the kiln-dried, vertical-grained, clear all-heart we buy, blasts out a lot better than red cedar. I get a better effect because it's a little more grainy—and brittle. Red cedar, on the other hand, blasts out a little flat [even], and because it's more close-grained, it takes almost twice as long to blast."

Brent special-orders his redwood stock from local lumberyards, but he occasionally runs across a windfall elsewhere.

"Out back behind the shop, I have a recycled redwood pile. It's the used lumber from an old redwood water tank that belonged to the railroad. I bid on it at an auction," says Brent as he opens the door and steps out. Picking up the end of a dirty gray board, he continues. "It was all discolored by weathering, such as you see here. But I scraped it with a pocketknife and saw that it was clear vertical grain. Out of each 20′ board, I got 17′ of usable wood 8″ wide and 2⅛″ thick! Of course, I had to have it planed down to get the weathering off."

For most of their signs, though, Brent and Carol rely on lumberyard stock. But they learned how to shave costs. "I use 2×8″ redwood boards and edge-join them for most of our signs," Brent notes. "I could join 2×12s, but the sign wouldn't be any stronger, and the wider stock would just drive the cost up."

What about construction-grade redwood? "We work with some construction grade," responds Brent. "It tends to be a little more rustic with the knots in it, yet it can be real attractive with the sapwood in there. But, it's not kiln-dried, and fresh out of the wrapper [off the truck or flat car] it's pretty wet. That means we

Continued

The 4×8′ sign for this Brainerd-area lumberyard catches motorists' attention with its Northwoods' motif. It marks a near-hidden turn-in customers might pass.

have to store it for months, letting it dry out."

Recently, Brent discovered another alternative for sign stock: short redwood mill ends and cutoffs finger-joined into a 4×16′ panel. "They're a full 2″ thick, and sell for about $400," he says. "If I bought boards and glued them into a panel of the same size, it would cost me $530, not including my time!"

Partners in craft: How a sign comes together

At Signcrafters, Carol and Brent share equally in sign design. When it comes to execution, however, they divide responsibilities. Brent does the woodworking. Carol handles the art.

Brent's woodworking skills first come into play during fabrication. That's when he cuts 2×8 redwood boards to length for a particular sign, then runs them through his 8″ jointer. After that, he aligns the boards and joins them edge to edge with dowels. "I dowel them more for alignment than strength," Brent comments. "It just makes it easier to clamp them together."

For glue, Brent relies on Ultra-Bond, made specifically for the sign trade by Sign Life Products, as is much of the finishing material in the shop. "It's like Titebond," he says.

Once the glue dries in Brent's sign blank, he uses a router to shape a 1″, full-length tenon on the ends. These will fit into mortises in the posts when the sign goes up. Finally, after sanding the blank down with 80-grit paper on his beltsander, he turns the sign-to-be over to his partner.

After perfecting the details of the sign design, Carol traces a full-sized pattern of it onto the *resist*—

a sheet of tough, adhesive-backed rubber—with the aid of an opaque projector. Now, she must transfer the pattern to the wood and ready the sign for Brent to carve by sandblasting. Follow the process in the photos *below*. (To try it, first read "Sandblasting," *WOOD*® magazine, April 1990.)

Dealing with details before the sign goes up

If everything goes the way they like it to, Brent and Carol contract

The making of a sign

1 To transfer a pattern to the rubber resist, the signmakers use a pounce wheel. It perforates the outline of the letters on the paper.

2 Going over the paper pattern with a pounce pad laden with colored chalk transfers the design image to the resist through the tiny perforations.

◀ Carol calls on her artistic talents to color and shade the various pictorial aspects of a local resort's logo sign.

▲ Twenty-two-carat gold leaf adds to a sign's appeal and expense. Brent lays it down, then burnishes it in place.

to erect the sign, then they weigh the pros and cons of several support systems available. "For instance," says Brent, "we feel that on a big sign, the posts are part of the design package. A beautiful sandblasted sign hung between two skimpy steel posts or a pair of wobbly 2×4s ruins the whole effect. When the code says that the customer must use the existing posts, we're stuck."

But when Brent and Carol have their way, they plan out the hanging framework of posts or poles, too. That allows Brent to give the supports his special treatment.

"I don't sand redwood posts smooth," he says, patting the textured surface of a nearby post. "I either use rough-sawn posts or rub them up with 50-grit on the beltsander. That's because my concern is longevity. By abrading the wood, I give it more surface area for the finish to soak into and cling to. Laughing, Brent adds: "But I have to tell people that I really *do* know about finer grits!"

Fine finishing—and that includes painting—ranks high on the signmaking pair's priority list. For if a finish fails, a sign fails, and so could their business. Brent describes their precautions:

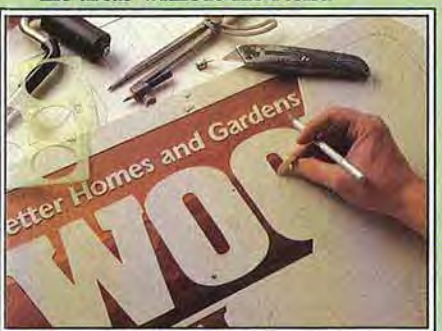
"First of all, before we paint, I sand all the flat, non-blasted surfaces with 120-grit so that the primer and paint goes on smoothly. Carol then uses Chromatic and One-Shot enamels for the solid-color finish work—they're specifically formulated for the sign trade. For background stain she uses oil or latex."

Finally, there's the protective coat that seals the unpainted, natural part of the sign against the ravages of the elements. "We've always used Sikkens Cetol clear wood finish," says Brent. "With it, I have to apply two base coats of Cetol 1, followed by a coat of Cetol 23 Plus. Sikkens is marketed as an exterior finish for cedar and redwood homes, but we found out that it really holds up on outdoor signs."

In fact, Brent and Carol's signs have an outstanding durability record. But what really holds up around Brainerd is what their signs can do. "We have certainly discovered how important signs can be to a business," says Carol. "They're without a doubt a cost-effective form of advertising, and definitely shouldn't be the last thing thought about when people go into business."

Written by Peter J. Stephano
Photographs: Jeff Frey & Assoc.

3 An X-acto knife slices through the rubber resist along the design's letter outlines. Brent will sandblast the areas without the resist.



4 With fine silica sand, Brent carves the redwood. The pressure-fed sandblaster attached to his compressor allows him to blast to a ¼" depth.

5 Carol takes over with enamels after sandblasting. Some signmakers paint the letters before blasting, but this way produces sharper letters.

Print this article

SEAFARER'S

A TURNING THAT'S SURE TO MAKE WAVES

Don't let the nautical air of this turned teak timepiece surprise you. You see, *WOOD*® magazine's design editor Jim Downing designed and built it to hang in the cabin of his sailboat. He went with staved construction, allowing him to hide the end grain while including maple accents at 12 points around the clock. Whether on land or sea, this one's a winner.

We used the following tools and supplies:

Stock
- ¾x4×30" teak
- ¾×1½x30" maple

Lathe tools
- 3–4" faceplate
- Spindle gouges, ¼", ½"
- Skew, ½"
- Parting tool

Lathe speeds
- Roughing: 500-800 rpm
- Finishing and sanding: 1,200–1,500 rpm

Rip two 1⅞"-wide pieces from a ¾×4×30" teak board. Laminate them with epoxy glue to make 1½×1⅞x30" material for the body staves. Important: When gluing teak, wipe the joint surfaces with acetone to remove the wood's natural oils. Let the acetone dry before gluing the joint.

Next, rip a 1/16"-thick strip from a ¾×1½x30" piece of maple. Uniform thickness is critical for this strip—any taper or waviness will cause problems when you glue up the clock blank.

To rip the thin strip safely and accurately on a tablesaw, cut it on the outside of the blade rather than between the blade and the rip fence. (See "The Safe and Simple Thin-Strip Ripper," *WOOD*® magazine, September 1991, *page 58*, for a jig that makes the job easy.) Crosscut 12 pieces 2" long from the strip.

OK, let's saw the staves

To miter-cut the body staves, equip your tablesaw with a miter gauge and auxiliary fence. (Or use a sliding-table jig.) Set it to cut a 15° angle, and place a stopblock for a 2" cutting length. (See the setup on the *opposite page.*)

Before cutting the teak, test your setup for accuracy. Saw a 15° angle on one end of a piece of scrapwood. Flip the workpiece to place the opposite edge against the miter gauge. Push the mitered end against the stopblock, and cut, forming a wedge-shape piece.

Saw three scrapwood staves, and assemble them into an arc. Confirm with a try square that the angle between the ends is 90°.

Now, miter-cut the 12 teak staves for the clock body. To keep the grain on the clock-body rim consistent, flip the stock to saw the pieces as shown in the Sawing the Staves drawing. Number each one as you cut it.

Dry-assemble the body, placing the staves in order. Then, slide a 1/16" maple piece into each joint. Epoxy the body together and secure with a band clamp.

Fix up a faceplate

Attach a ¾×8"-diameter scrapwood auxiliary faceplate to your lathe's faceplate. Turn the face true, and mark concentric circles on it about ½" apart.

Place the staved body blank on a piece of ½"-thick stock. Trace around the inside blank opening with a sharp knife or scratch awl. Scrollsaw or bandsaw around the line to form a plug that fits snugly into the blank opening.

Screw the plug to the auxiliary faceplate, centered inside the nearest concentric circle. Place the body blank over the plug, and secure it with spots of cyanoacrylate adhesive.

Everything's shipshape now

With the ½" gouge, round the blank to 7" diameter. True the cylinder with a skew. Cut in to the diameters shown on the full-sized pattern with a parting tool.

Remember, the cutting depth from the side of the blank will be only one-half of the difference between the diameters. To establish a 5" diameter, for example, cut in 1" on the 7" blank.

Now, turn the outside to the profile shown. The ¼" and ½" spindle gouges will do the job. Sand the turning with progressively finer grits from 120 to 400.

Turn the inside opening to 4 5/16" diameter to accept the clock movement. Before turning down to the mounting plug on the faceplate, form a rabbet for the clock bezel by turning the opening to 4½" diameter ⅜" deep.

Continue turning the 4 5/16" inside diameter until you free the clock body from the faceplate. Complete the inside opening with a flush-trimming bit in a table-mounted router.

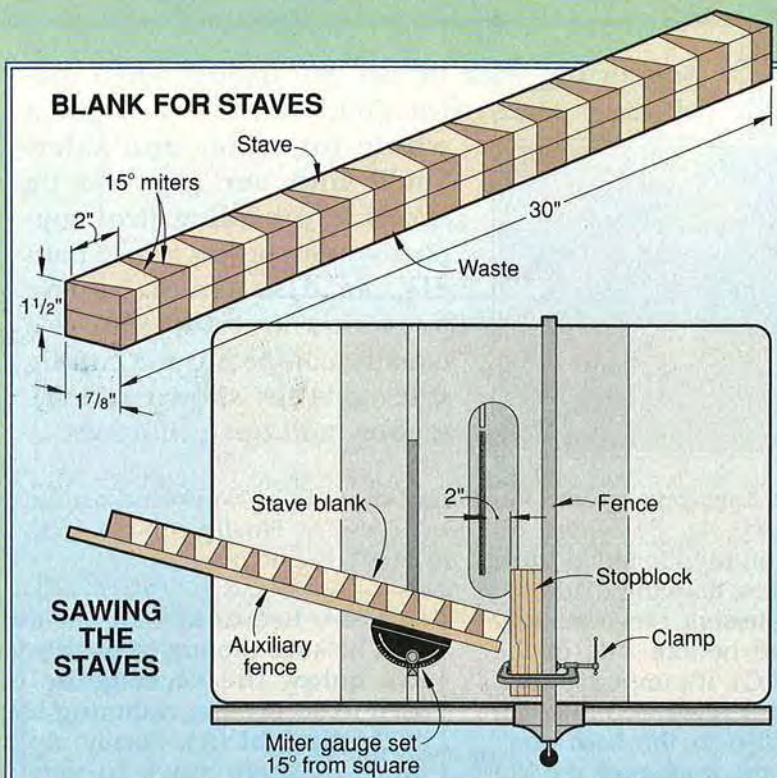
Rout a keyhole slot on back of the clock for hanging. Center it on one of the maple strips. Apply a clear finish, and insert the clock movement into the body.

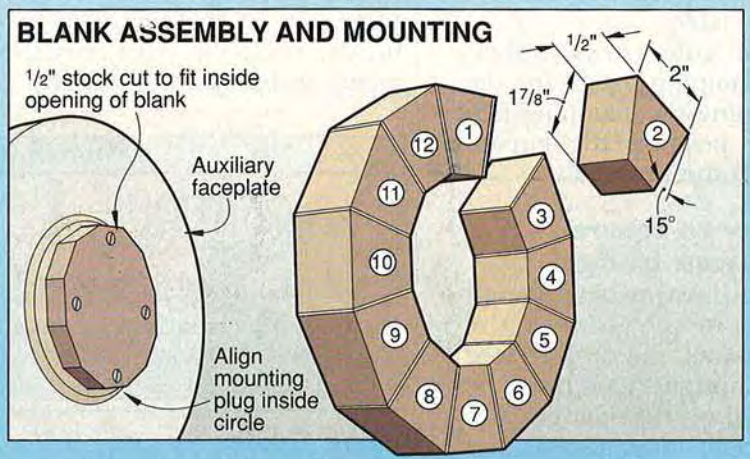
Buying Guide

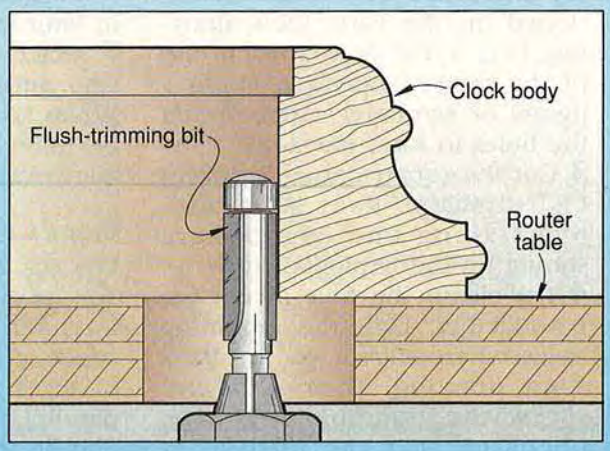
Clock. Insert with month, day, date, and moon dials. Product no. 71160, $48.50 ppd. in U.S. Klockit, Box 636, Lake Geneva, WI 53147, call 800/KLOCKIT.

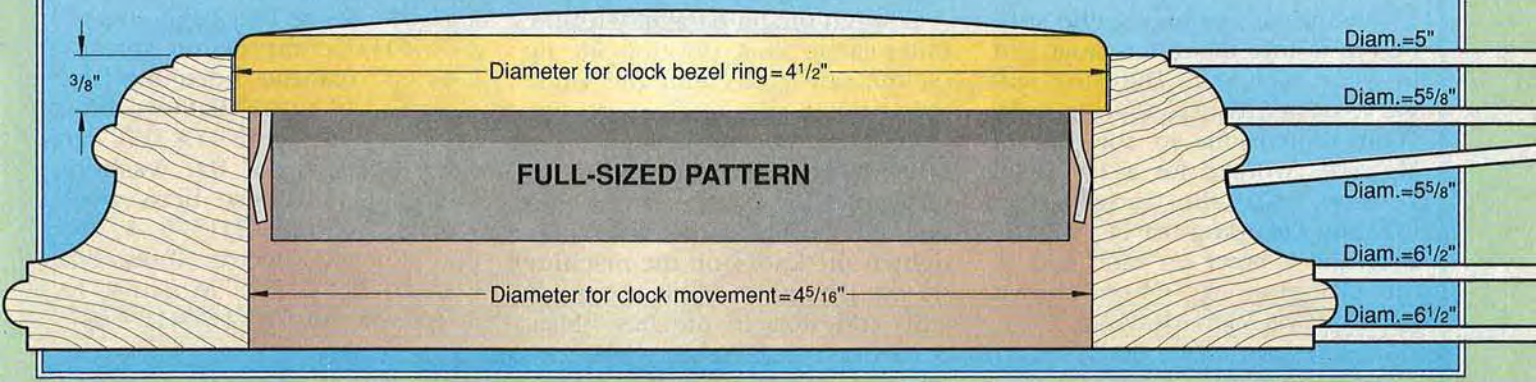
Project Design: James R. Downing Illustrations: Mike Henry; Kim Downing Photograph: Wm. Hopkins

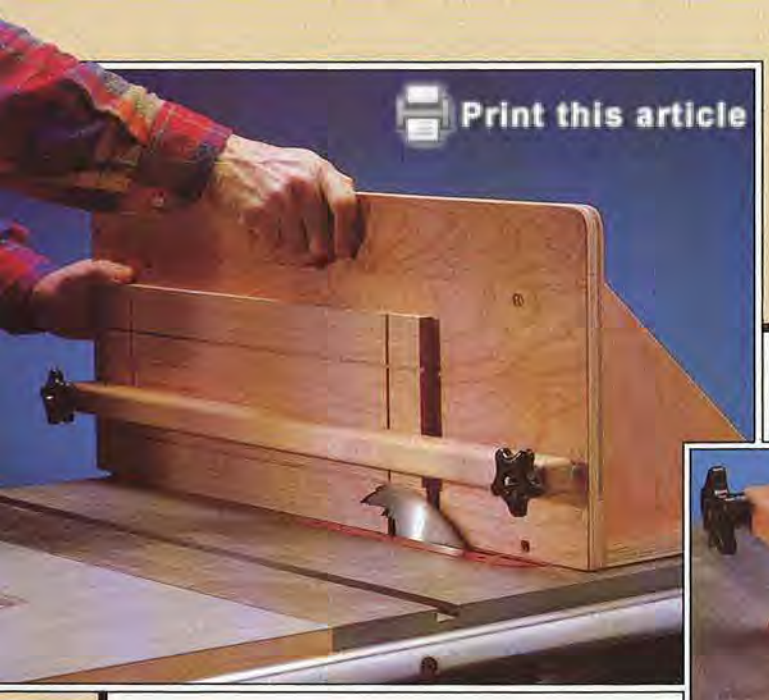
CLOCK


BLANK FOR STAVES
Stave
15° miters
2"
30"
Waste
1 1/2"
1 7/8"
SAWING THE STAVES
Stave blank
2"
Fence
Stopblock
Clamp
Auxiliary fence
Miter gauge set 15° from square


BLANK ASSEMBLY AND MOUNTING
1/2" stock cut to fit inside opening of blank
Auxiliary faceplate
Align mounting plug inside circle
1/2"
2"
1 7/8"
15°
1
2
3
4
5
6
7
8
9
10
11
12


Clock body
Flush-trimming bit
Router table


3/8"
Diameter for clock bezel ring = 4 1/2"
FULL-SIZED PATTERN
Diameter for clock movement = 4 5/16"
Diam. = 5"
Diam. = 5 5/8"
Diam. = 5 5/8"
Diam. = 6 1/2"
Diam. = 6 1/2"



HIGH AND MIG

Supporting wide or tall workpieces when machining edges with your tablesaw just got a whole lot easier and safer. You'll find our plywood jig excels at providing firm support when cutting raised panels, as discussed in the previous article. And it's equally competent for cutting stile ends (as shown *at left*), tenons, and open mortises.

First, let's build the jig

1 Cut the base and upright (A) to the size listed in the Bill of Materials. (We cut ours from ¾" birch plywood.) Cut and sand a ¾" radius on two corners of each piece where shown on the Exploded View and Parts View drawings.

2 Mark the slot locations on the top face of the base where dimensioned on the Parts View drawing. Drill a 5⁄16" hole at each end of the marked opening. Using a jigsaw or scrollsaw, cut between the holes to form the slots.

3 Cut the square-cornered braces (B) to shape. Rout ¼" roundovers along one edge where shown on the Exploded View.

4 Dry-clamp the four pieces (A, B) together. Drill the mounting holes where shown on the Parts View drawing. Then, glue and screw the assembly together, checking that the upright is square to the base.

5 Cut the miter-gauge guide strip (C) to fit into the miter-gauge slot in your tablesaw. The size will vary, depending on your saw. (Our dimensions in the Bill of Materials worked for a 10" Delta Unisaw.) Cut the upright stop (D) and clamping bar (E) to size. Belt-sand a taper on each end of the clamping bar where shown on the Parts View drawing.

6 Mark the hole centerpoints on each piece (C, D, E) where dimensioned on the Exploded View and Parts View drawings. Drill the holes. Countersink the mounting holes on the bottom side of the guide strip (C). It's important that the machine screws used to fasten the guide strip to the base don't rub against the bottom of the slot in your saw table.

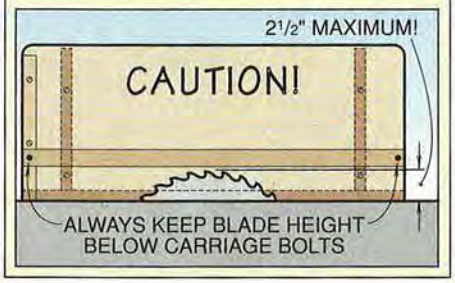
7 Attach the guide strip, upright stop, and clamping bar to the jig. When fastening the clamping bar, be sure to position the curved edge next to the upright.

Here's how to square the jig to your blade

To prevent burning and rough cuts when bevel ripping the edges of a panel, the outside face of the jig upright (A) must be parallel to the miter-gauge slot. The jig upright must also sit at a right angle to the saw table.

To align the jig parallel with the miter-gauge slots, position the jig on the saw table with the guide strip (C) in the miter-gauge slot. Then, align the jig parallel to the other miter-gauge slot. Do this by measuring the distance from both ends of the jig to the slot. Then, tighten the knobs on the machine screws that go through the guide strip and slots in the base. Measure carefully to verify and realign as necessary. Finally, test-cut scrap to verify the alignment.

***Caution:* Before turning on the saw, be sure the top of the blade lies below the carriage bolts used to secure the clamping bar to the upright (A).** Finally, rip a piece of scrap stock to verify alignment. If the piece burns or binds, recheck your measurements and adjust accordingly.



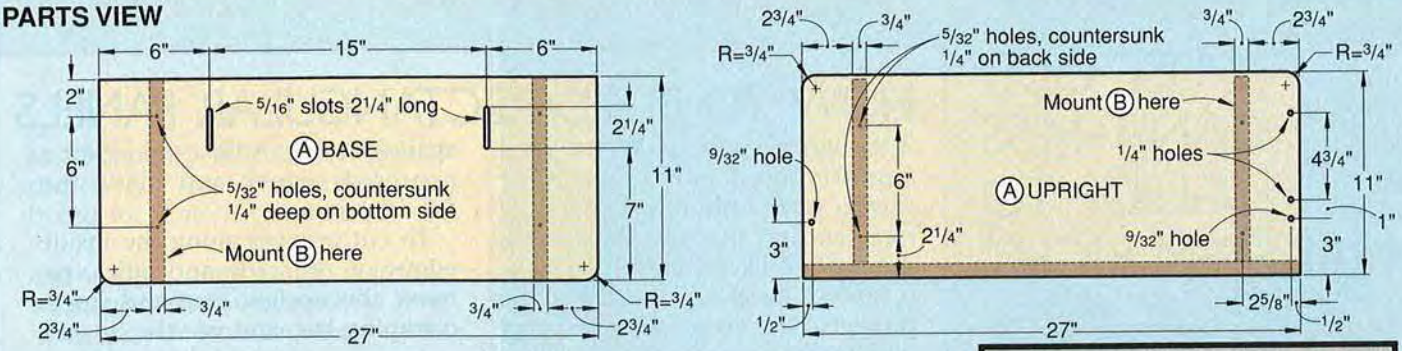
Buying Guide

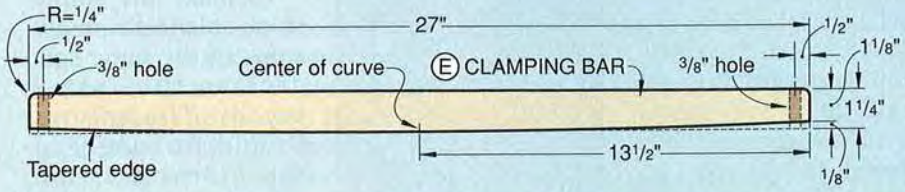
• **Jig hardware.** 4–2" plastic knobs, 2–#10-24 T-nuts, 2–⅜×1⅛" compression springs, 2–¼×2" flathead brass machine screws, 2–#10×1" flathead brass machine screws, 2–¼×3½" carriage bolts, 6–¼" flat washers, 8–#8×1½" flathead brass wood screws. Stock no. TJ1575, $15.75 ppd. Puckett Electric Tools, 841 Eleventh St. Des Moines, IA 50309, or call 515-244-4189.

Produced by Marlen Kemmet Project Design: James R. Downing Photographs: Wm. Hopkins Illustrations: Kim Downing

HTY TABLESAW JIG

PARTS VIEW



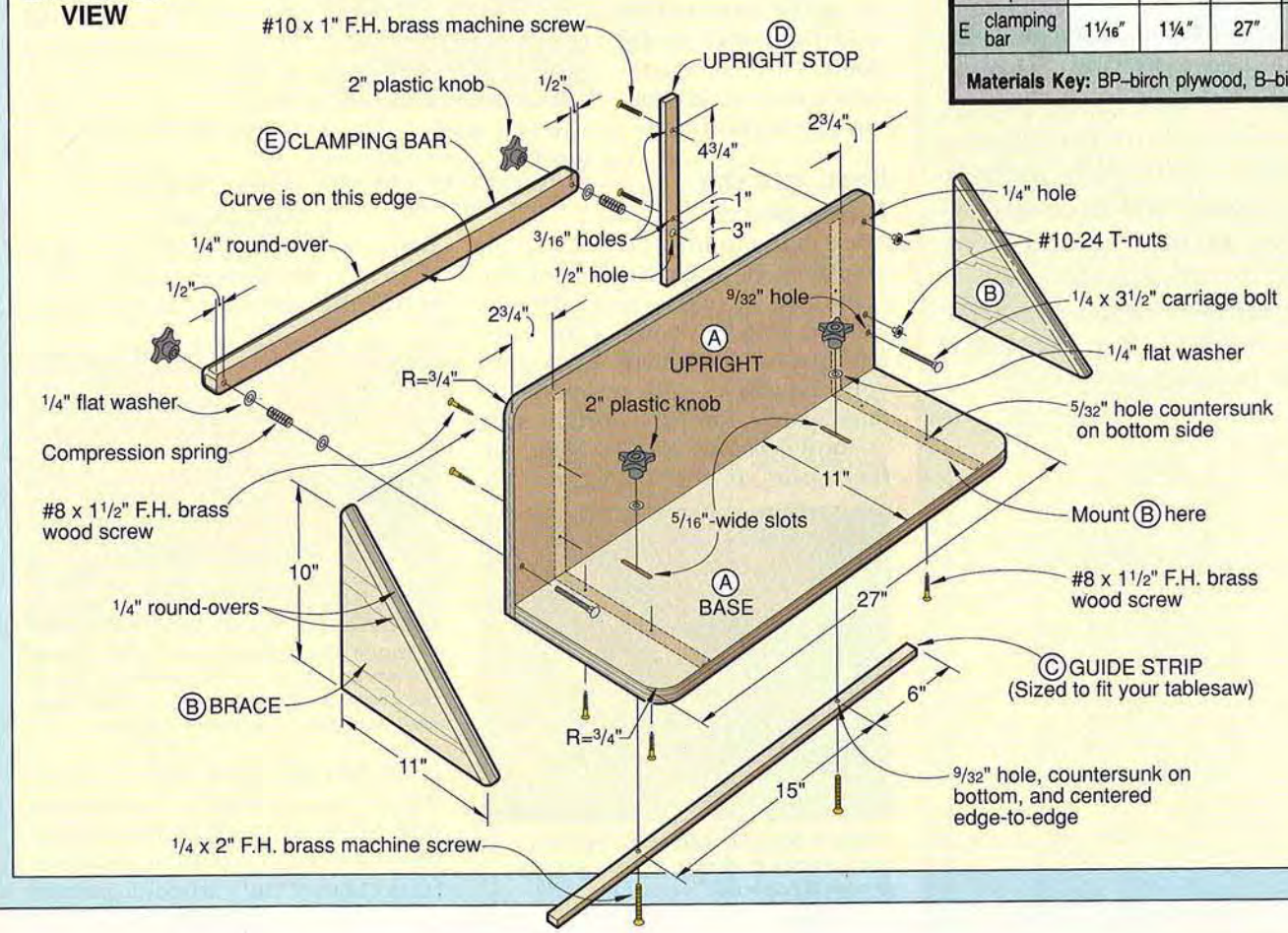


Bill of Materials

	Part	Finished Size T	W	L	Mat.	Qty.
A	base & upright	¾"	11"	27"	BP	2
B	braces	¾"	10"	11"	BP	2
C	guide strip	⅜"	¾"	27"	B	1
D	upright stop	½"	1"	10"	B	1
E	clamping bar	1 1/16"	1¼"	27"	B	1

Materials Key: BP–birch plywood, B–birch

EXPLODED VIEW



HIGH-STYLED RAISED PANELS AND

USE OUR CAN'T-MISS GUIDE TO MAKE 'EM RIGHT

PROVEN TECHNIQUES FROM THE SHOP TESTED WOOD MAGAZINE SHOP

For centuries, both woodworkers and the general public have viewed raised panels as a hallmark of fine craftsmanship. And with today's power tools and accessories, they're easier than ever to make. In this article we'll share the techniques for making several versions of these classic beauties.

Print this article

HOW TO BUILD RECTANGULAR PANELS

Although easy to build, the rectangular raised panel and frame shown in the photo and drawing *right* and on the *next page* offers the type of clean looks that make it perfect for many woodworking projects. To make such a panel and frame, you first need to build the simple tablesaw jig shown on *page 34*. Once made, this jig will help you safely and accurately cut panel bevels that require minimal cleanup. You'll also use it to cut the grooves that hold the panel in the frame. Now, let's construct this great-looking panel and frame.

You can make a raised panel and frame like this with just your tablesaw and our handy jig.

First, cut the frame pieces

After determining the outside dimensions of your frame, cut the rails and stiles to size. To cut grooves into the ends of the rails, mount a ¼"-wide dado blade into your tablesaw, and position the rails against the jig's upright stop as shown *below*. Always place the face side of the frame pieces against the jig. Adjust the jig for a centered groove and make the ⅜"-deep cut.

Position the rail against the upright stop and clamp it down before cutting a groove in its end.

To cut grooves along the inside edges of the rails and stiles, remove the upright stop and stock-clamping bar, and use the jig as a fence as shown *below*.

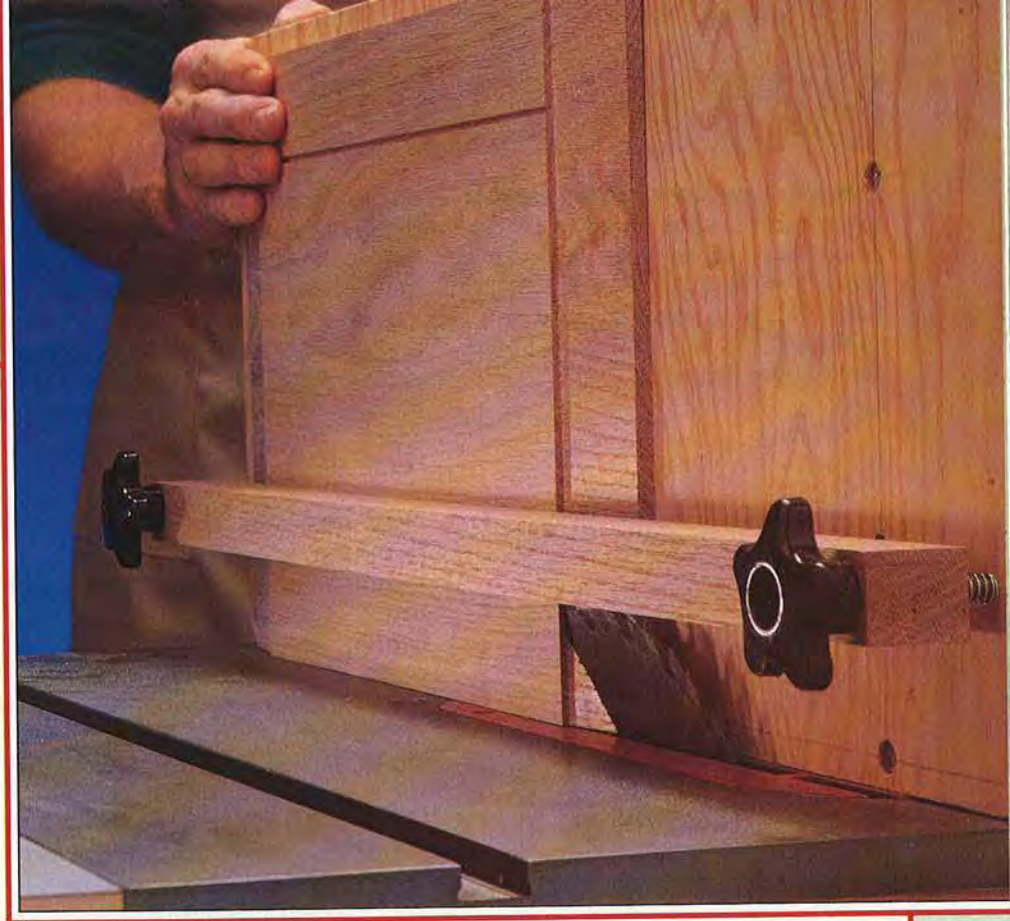
To make the spline stock, plane or resaw stock of the same species as the frame pieces. The splines should fit snugly in the grooves. If the splines will be visible in your finished frame (as with a cabinet door), make them a little long and trim them flush after assembling the frame.

Now, make the panel

Before you start cutting your panel to size, spend some time examining the grain orientation and color of your stock. For example, if you make a narrow panel from one piece of stock with a cathedral (inverse V) pattern, be careful to center the cathedral pattern

Remove the upright stop and stock-clamping bar from the tablesaw jig to cut grooves along the edges of the rails and stiles for your panel's frame.

FRAMES



on the panel. If you use several pieces, cut them from the same board for a close color match.

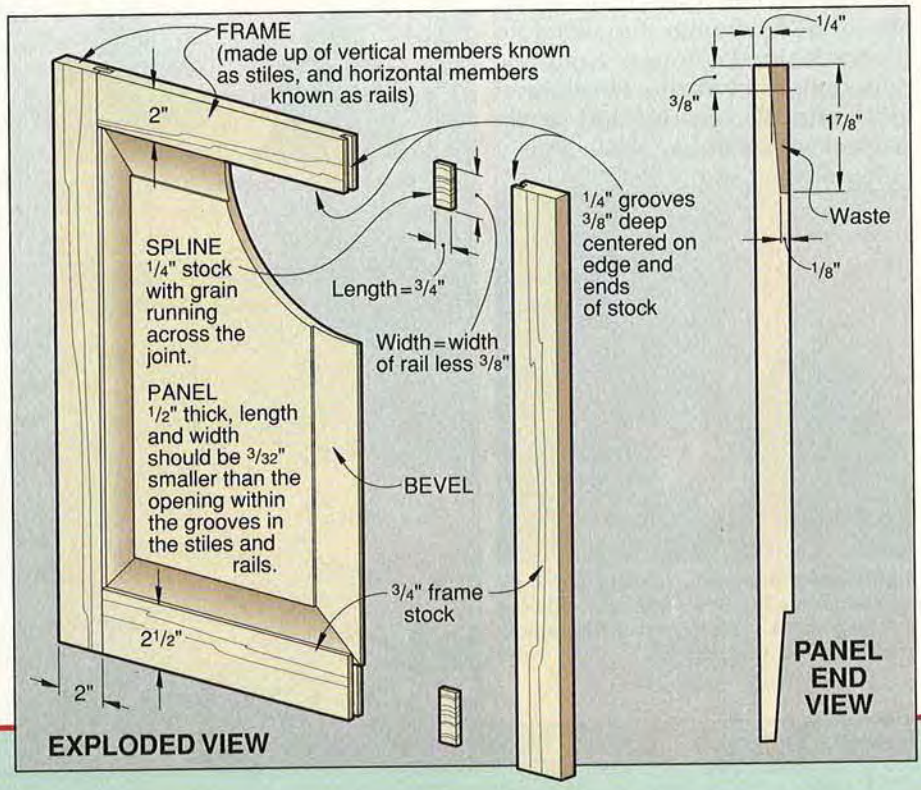
Note: *For dimensional stability we suggest that you make up your raised panels from stock no wider than 8".*

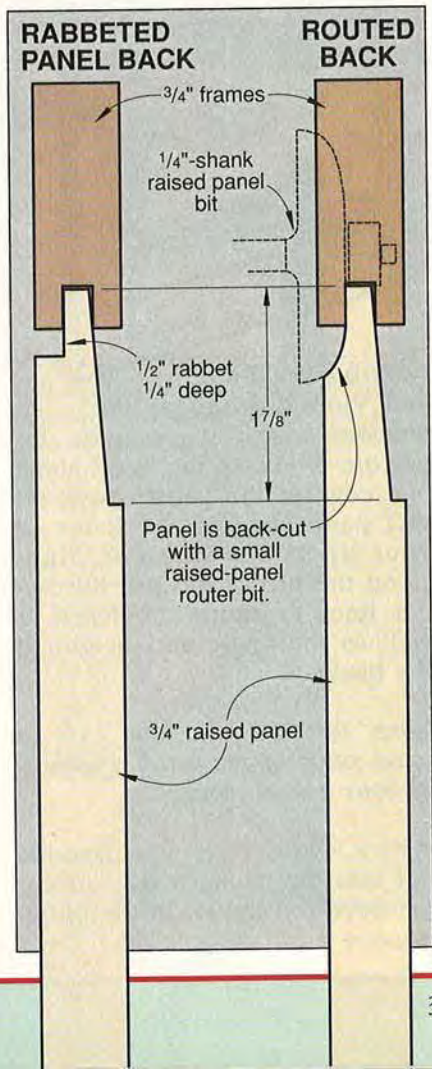
If you don't have access to ½" thick stock, or the means to plane thicker stock to ½" thickness, you can make the panel from ¾" stock. However, the face of the panel will be ¼" higher than its surrounding frame—generally an undesirable look, unless you level the panel's front by either of the following two methods.

First, you can rabbet the back side of the panel as shown in the example *right*. This leaves a square groove around the inside perimeter of the frame, on the back side of the panel.

For a decorative alternative to this square rabbet, try backcutting the panel with a small (2" diameter with ¼" shank) panel-raising bit such as the model shown *right*. See the Buying Guide on *page 41* for a source for this bit.

Continued

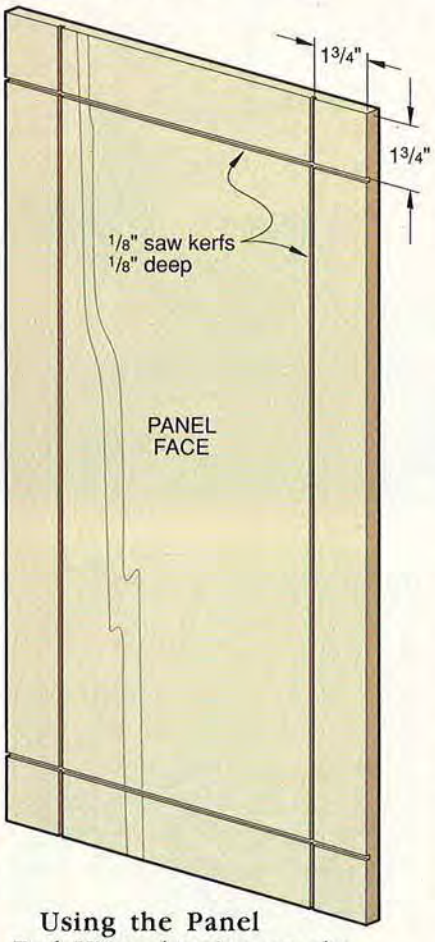

FRAME
(made up of vertical members known as stiles, and horizontal members known as rails)
2"
SPLINE
1/4" stock with grain running across the joint.
Length = 3/4"
Width = width of rail less 3/8"
PANEL
1/2" thick, length and width should be 3/32" smaller than the opening within the grooves in the stiles and rails.
BEVEL
3/4" frame stock
2 1/2"
2"
EXPLODED VIEW
1/4" grooves 3/8" deep centered on edge and ends of stock
1/4"
3/8"
1 7/8"
Waste
1/8"
PANEL END VIEW



RAISED PANELS AND FRAMES

Here's how to cut the bevels

After cutting your panel to its finished size, adjust your tablesaw's fence 1¾" from the blade. Cut ⅛" kerfs, ⅛" deep along all four sides of the panel's face as shown in the illustration *below*.



Using the Panel End View drawing on the *previous page* as your guide, lay out the profile of the bevel along one edge of the panel. Now, set this panel against the fence of your jig as shown *right*. Sight along the blade, and use the layout lines to adjust the fence as well as the angle and height of the blade.

Note: *Test the following cuts in scrap stock of the same thickness as your actual workpiece.*

Now, clamp your panel faceside out into the tablesaw jig and cut the bevels as shown in the photo on the *previous page*. Make the end-grain cuts first. These deep cuts require a sharp, 24-tooth ripping blade. If you have a saw of less than 1½ hp you may need to use a thin-kerf blade to maximize your saw's power. Move the panel through the blade at a consistent speed, slowing down only if the blade slows.

And now for the finishing touches

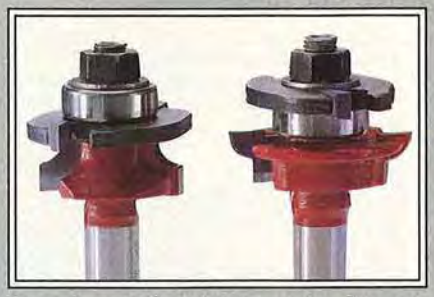
Because the jig holds the panel firmly during the bevel cuts, you should notice few, if any, sawtooth marks. Remove marks on the top and bottom bevels with 100-grit sandpaper and a hardwood sanding block. Finish-sand the top and bottom bevels with a block and 150-grit abrasive. Now, repeat this procedure on the side bevels. Doing it this way gives you maximum control over stock removal. Be careful not to sand away the ridge at the intersection of the two bevels.

Dry-clamp the panel and frames to check for fit. Disassemble the pieces and apply stain to both sides of the panel. This way, any seasonal contraction of the panel will not reveal unfinished areas. Then, glue and clamp the frame assembly, allowing the panel to float within the frame. Sand the rails and stiles flush. Finish-sand and stain the frame, and apply your clear finish.

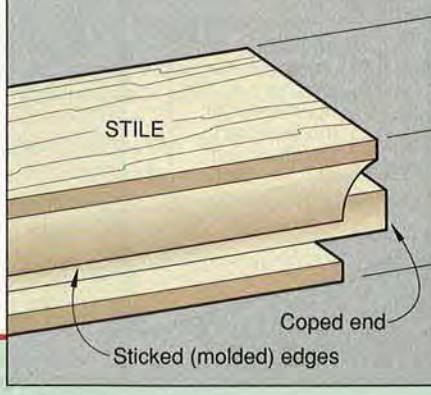
Sight along the blade to adjust the jig and blade for the bevel cut. Test this cut in scrap stock. (We removed the stock-clamping bar for clarity.)

A ⅜" round-nose router bit helps you create a panel with a decorative flair such as this one.

Frames with cope-and-stick joinery look great and go together in a jiffy.

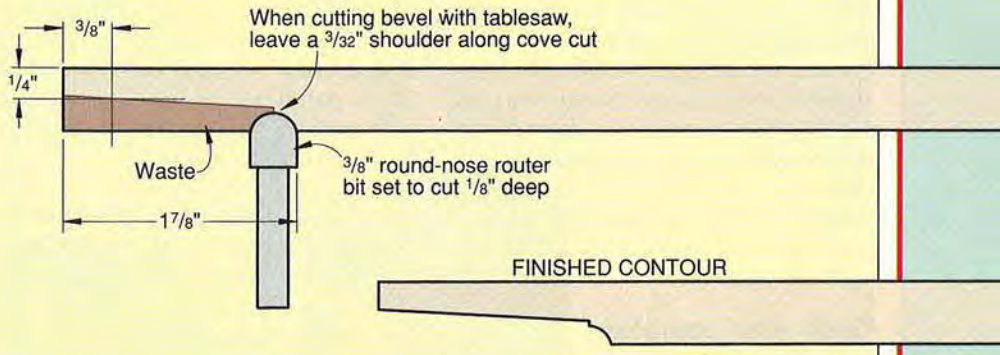


Two-piece rail-and-stile router bit sets such as these make simple work of cope-and-stick joinery.



ADD A LITTLE PIZZAZZ TO YOUR PANEL

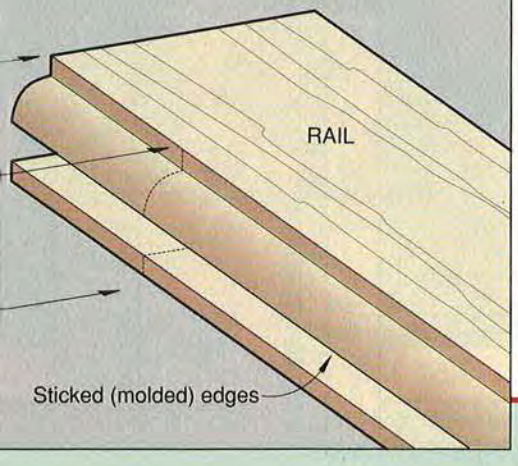
You can dress up the panel described in this section by routing grooves in the face of the panel with a ⅜" round-nose bit (also known as a core-box bit). These grooves take the place of the ⅛" saw kerfs described earlier. After cutting the grooves to a depth of ⅛" according to the drawing *right*, cut the bevels with your tablesaw. This results in a panel like the one *left*.


3/8"
When cutting bevel with tablesaw, leave a 3/32" shoulder along cove cut
1/4"
Waste
3/8" round-nose router bit set to cut 1/8" deep
1 7/8"
FINISHED CONTOUR

COPE-AND-STICK JOINERY

Nearly all commercially produced raised panels have frames with cope-and-stick joinery, such as the example *left*. To make cope-and-stick frames, you'll need a matched rail-and-stile router bit set like the set shown *left*. Such sets cost $100 or more, but offer you several time-saving and aesthetic advantages.

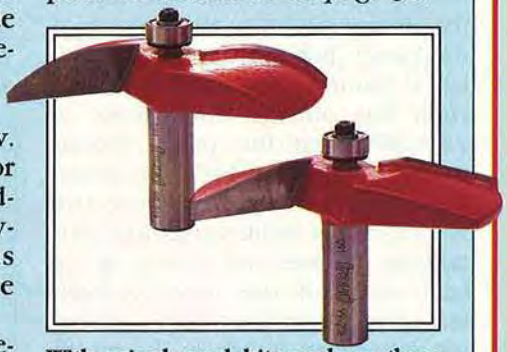
As shown in the drawing *below*, cope-and-stick frames do not require splines because the coped ends fit snugly into the stiles, and provide ample gluing surfaces. And, the bead along the inside of the frame provides a nice transition from the frame to the panel. To find out more about these sets, see *page 53* of the January 1993 issue of *WOOD®* magazine.



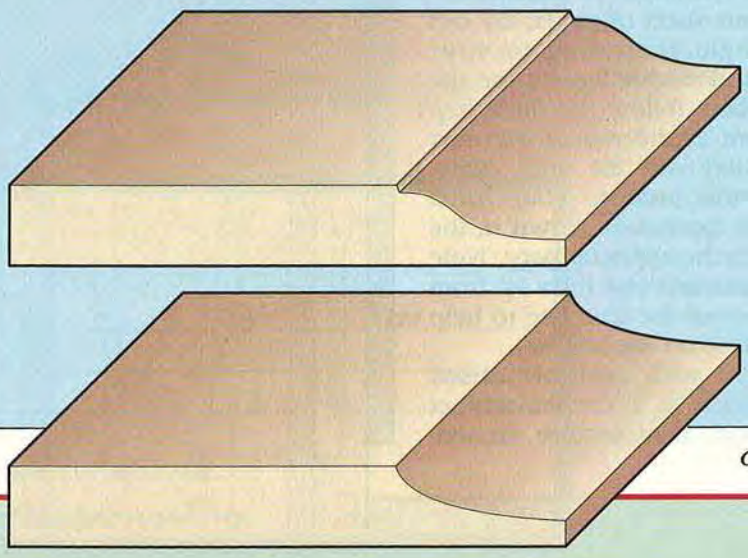
HOW TO RAISE PANELS WITH ROUTER BITS

If you have a router that accepts ½"-shank bits, you may be interested in raising your panels with router bits such as the versions *right*. We prefer the wide models (3½" in diameter) because they cut 1½"-wide bevels—nearly as wide as the bevels you cut with a tablesaw. Although these bits cost $50 or more, they offer you several advantages. First, you can cut bevels with curved profiles as shown *below*. Second, these bevels require no sanding.

Typically, these bits are designed for use with ⅝" or ¾" stock. With either bit, the panel will be higher than the surrounding frame unless you rabbet or back-cut the back of the panel as described on *page 35*.



With raised-panel bits such as these you can cut curved bevels that require no sanding.



Continued

HOW TO BUILD ARCHED-TOP PANELS AND FRAMES

As you can see in the drawing and photo *right*, arched-top panels and frames look terrific and assemble in much the same way as rectangular panels and frames. In this section we'll concentrate on the special requirements of this raised-panel type, starting with design.

An elegant arched top adds even more appeal to the basic raised panel and its surrounding frame.

Grab your compass and lay out the arch

You can lay out the arch for your panel in just a few minutes with a pencil, compass, straightedge, and a sheet of paper larger than the finished panel and its frame. First, determine the width of the panel and its height measured from the top of the planned arch to the bottom of the panel. For example, if the finished frame in the drawing *above right* has outside dimensions of 12×18", then the panel should measure 8 21/32 × 14 5/32". We determined this by subtracting the width of the rails and stiles and adding ¾" because about ⅜" of each edge of the panel is contained in the rails and stiles. Then, we subtracted 3/32" from the width and height to allow for contraction and expansion of the panel caused by changes in humidity.

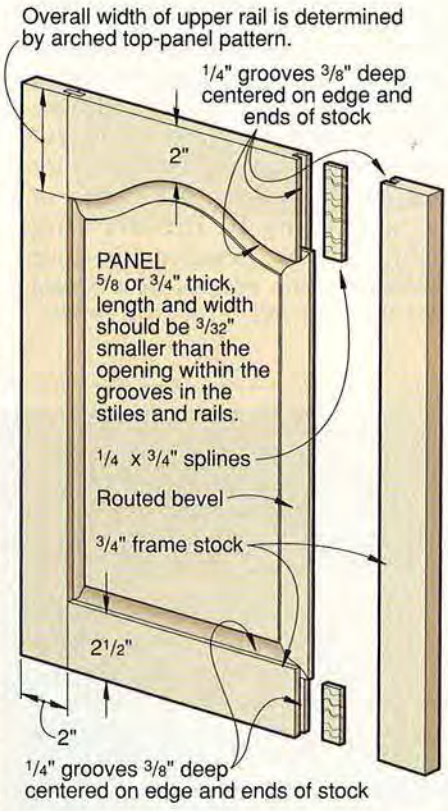
On your sheet of paper, lay out a rectangle according to your height and width figures for the panel. Then, follow the three-step procedure at the *top of the next page* to lay out the arch. Now, transfer this arch to your panel and your top rail as shown in the photo on the *opposite page*. Note that we marked two lines ⅜" from both sides of the template to help us center it on the top rail.

Projects with multiple raised panels, such as a kitchen-cabinet installation, may require arched-top panels of varying widths. For aesthetic reasons, the height of the arches should be the same from panel to panel. The boxed information *right* shows how to handle this situation.

Cut your parts and put it all together

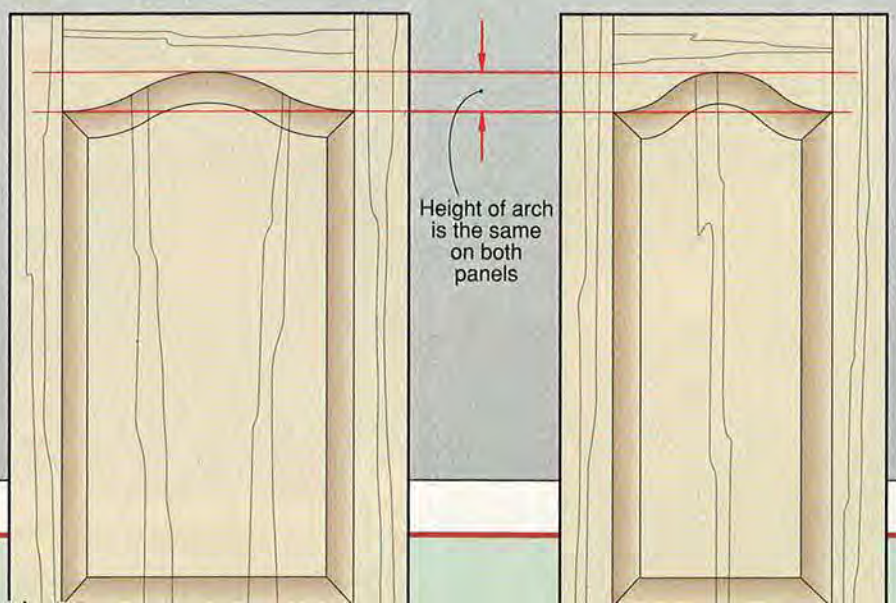
With a bandsaw, cut the arched portion of the panel and top rail, staying just outside the layout line. Sand to the line and smooth your bandsawn edges with a drum sander.

To cut the slots in the frame pieces, use a ¼" slotting cutter with ball bearing that cuts a ⅜"-deep slot. (See the Buying Guide on the *opposite page* for our source.) If you prefer the look of a cope-and-stick frame, you can substitute a rail-and-stile router


Overall width of upper rail is determined by arched top-panel pattern.
1/4" grooves 3/8" deep centered on edge and ends of stock
2"
PANEL
5/8 or 3/4" thick, length and width should be 3/32" smaller than the opening within the grooves in the stiles and rails.
1/4 x 3/4" splines
Routed bevel
3/4" frame stock
2 1/2"
2"
1/4" grooves 3/8" deep centered on edge and ends of stock

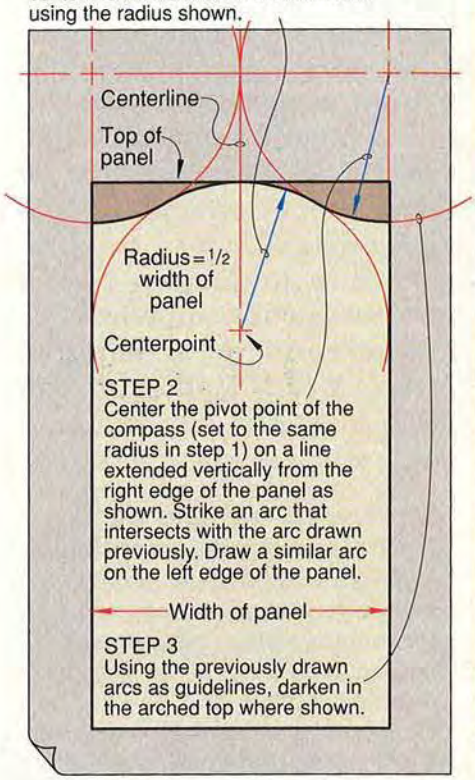
DEALING WITH VARIOUS WIDTHS OF

Although the width of the panels may vary within the same project, the height of the arch should remain the same. The width of the stiles and rails of the frame also are the same on both doors. Shown here is the procedure for laying out the arch on narrower or wider panels. In this example we are laying out an arch on a narrower panel from the existing panel on the left.



LAYING OUT A TEMPLATE FOR ARCHED-TOPPED PANELS

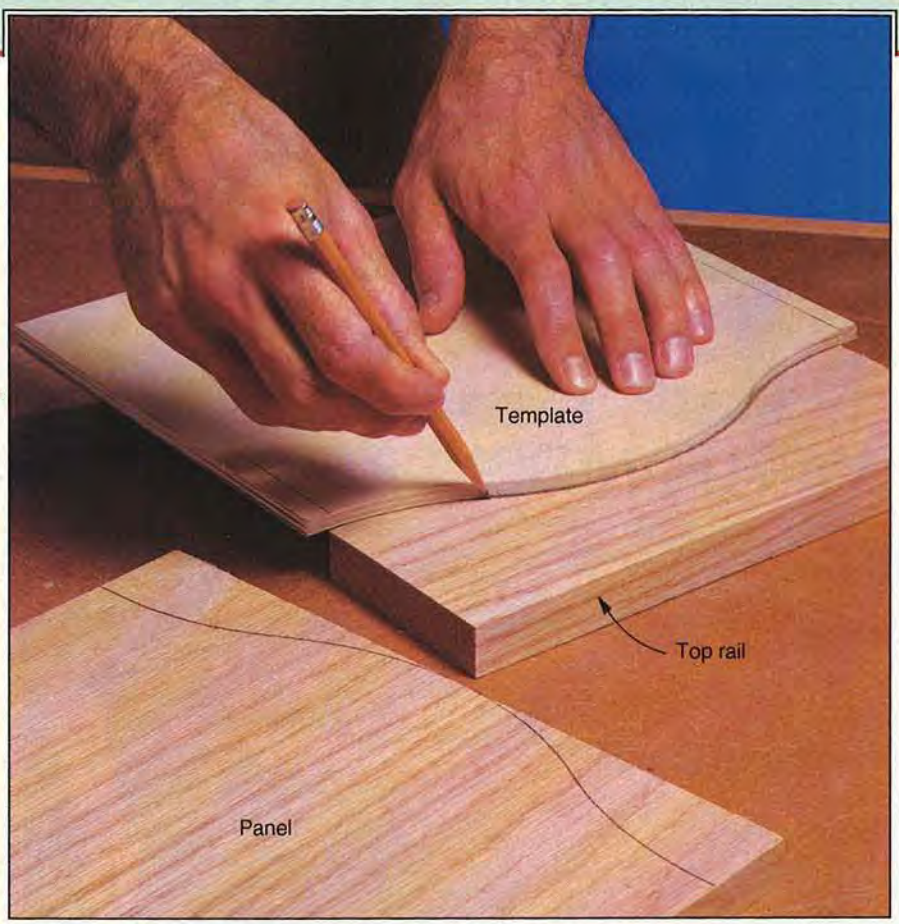
STEP 1
Locate the centerpoint on the vertical centerline where shown. Draw a circle using the radius shown.



STEP 2
Center the pivot point of the compass (set to the same radius in step 1) on a line extended vertically from the right edge of the panel as shown. Strike an arc that intersects with the arc drawn previously. Draw a similar arc on the left edge of the panel.

Width of panel

STEP 3
Using the previously drawn arcs as guidelines, darken in the arched top where shown.



Use a paper or plywood template to transfer the arch to the panel and top rail. Be careful to center the arch on the panel.

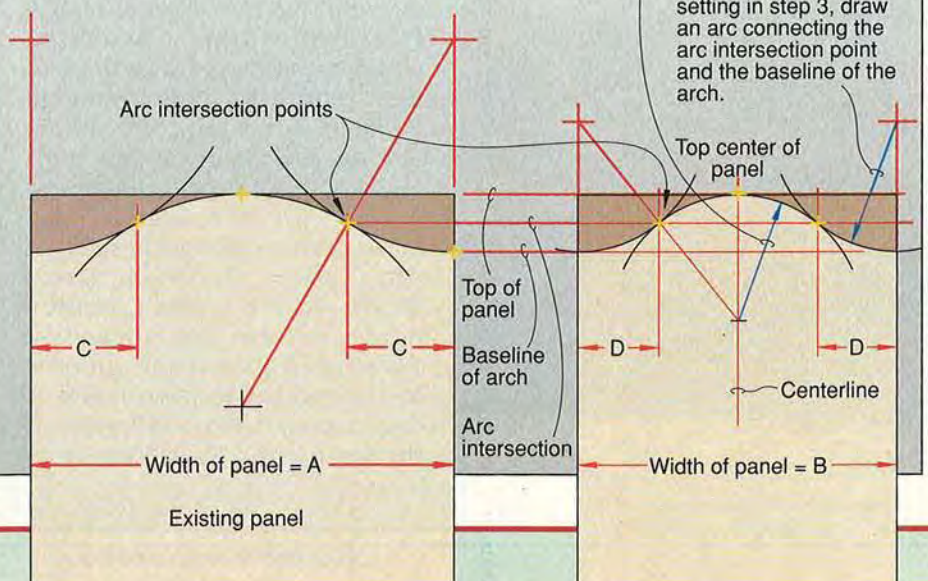
ARCHED-TOP PANELS

STEP 1
Using a framing square, transfer these three height lines to the panel on the right: Top of panel, arc intersection, and baseline of arch (where arch meets panel side).

STEP 2
Locate arc intersection points on the right-hand panel using formula: D = (B ÷ A) x C.

STEP 3
Using the trial and error method, draw an arc connecting the arc intersection points and the top center of panel.

STEP 4
Using the same radius setting in step 3, draw an arc connecting the arc intersection point and the baseline of the arch.



bit set in place of the slotting cutter. For more on this method, see the earlier section "Cope-and-stick joinery" on *page 39*.

With a raised-panel bit in your router table, cut a bevel around the perimeter of the face side of the panel. Assemble and finish the panel and frame pieces as described on *page 38*.

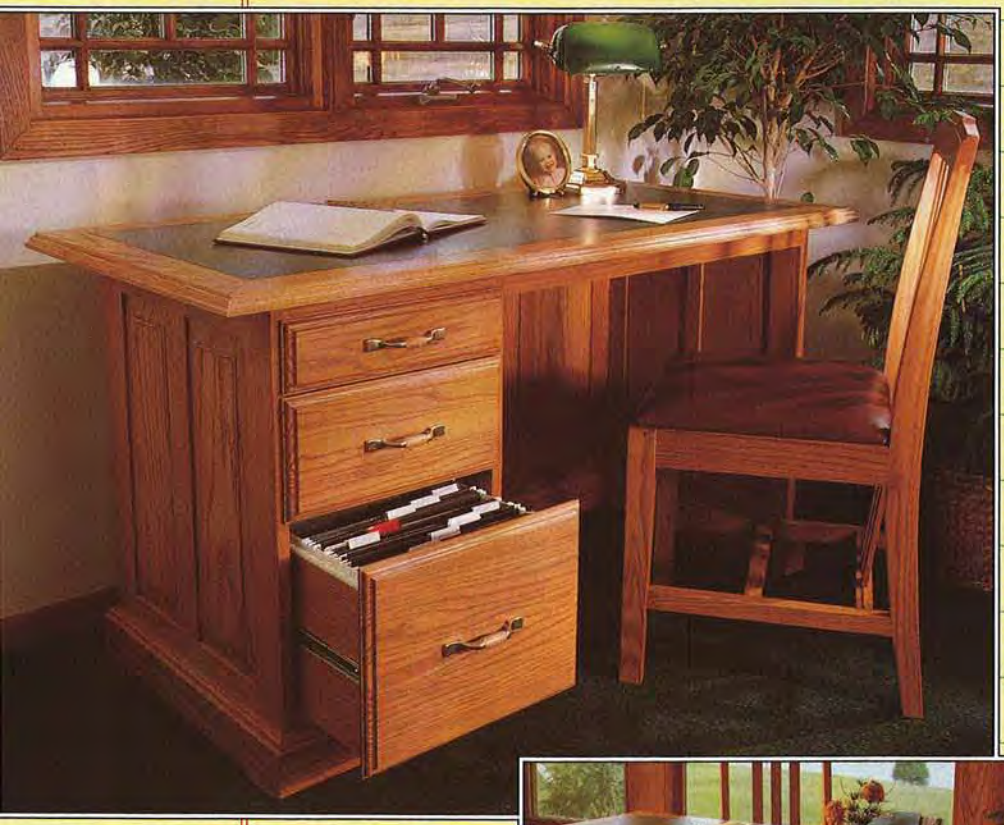
Buying Guide

- **Slotting cutter** that cuts ¼"-wide slot ⅜" deep. Item no. 368 (¼" shank) or no. 668 (½" shank), $14 ppd. (in U.S.) from MLCS, P.O. Box 4053 C-12, Rydal, PA 19046. Call 800/533-9298.
- **Small panel-raising bit** that's ideal for backcutting panels. Item no. 387, 2" diameter, ¼" shank, $25 ppd. (in U.S.) from MLCS at above address.

Written by Bill Krier with Jim Downing
Illustrations: Jim Downing; Kim Downing
Photographs: Hopkins Associates

DOWN-TO-BUSINESS OAK DESK

WITH HANDSOME RAISED PANELS



We've wrapped the oak-and-frame panels around the desk, allowing you to position it against a wall as shown *above* or to sit in the middle of a room as shown at *right*.

It would cost you about $1,500 to buy a raised-panel, solid-oak desk like the one shown here. But if you're willing to invest some time and effort, you can build this enduring, traditional furniture piece for about $350. And look what you get for your money—frame-and-panel construction, a smooth, attractive top, and a trio of drawers, one of which is large enough for hanging files. Best of all, you can proudly say you made it yourself.

Start with end and middle frame and panel assemblies

Note: To machine the panels (H), see the preceding technique article on how to make raised panels. To make the jig used to form the panels, see page 34.

1 To construct the two end frames and middle frame, cut the stiles (A, B), top rails (C), and bottom rails (D) to the sizes listed in the Bill of Materials. (We used red oak.) Note that you'll use two of the five stiles (B) for the large front frame.

2 Cut the front frame top rail (E), bottom rail (F), and mullions (G) to size.

3 Edge-join narrower stock to make up the raised-panel blanks (H). Following the tablesaw and router method and illustration from the techniques article on *page 38*, machine the panels.

4 Cut ¼" grooves ⅜" deep along the appropriate edges of A, B, C, D, E, F, and G. Also make grooves along the ends of parts C, D, E, F, and G where shown on the Frame Construction, End View, and Front View drawings. (To cut the grooves in the right place, we laid out the frames in the configuration shown on the End View and

Print this article

Front View drawings. Next, we marked the edges and ends needing the grooves, and did the cutting to these marked edges.)

5 Using ¼" stock (we selected plywood), cut the splines to the sizes dimensioned on the Frame Construction, End View, and Front View drawings.

6 Finish-sand and stain the raised panels. Staining the panels now prevents the exposure of an unstained line later if the panels happen to shrink slightly.

7 Glue and clamp the front frame together as shown in the photo *below right*. Check that the front frame clamps square and flat.

8 Before gluing and clamping the end and middle frames together, study the Assembling the Frames drawing. Notice that the panels in the left-hand and middle frames face on direction; the right-hand frame, the opposite direction. Once the pieces are in the correct configuration, glue and clamp the end frames and middle frame, letting them sit that way overnight.

9 Mark and cut the notch for the top rail (K) in the middle frame where shown on the Assembling the Frames drawing. Finish-sand both sides of each frame, being careful not to sand the previously stained panels.

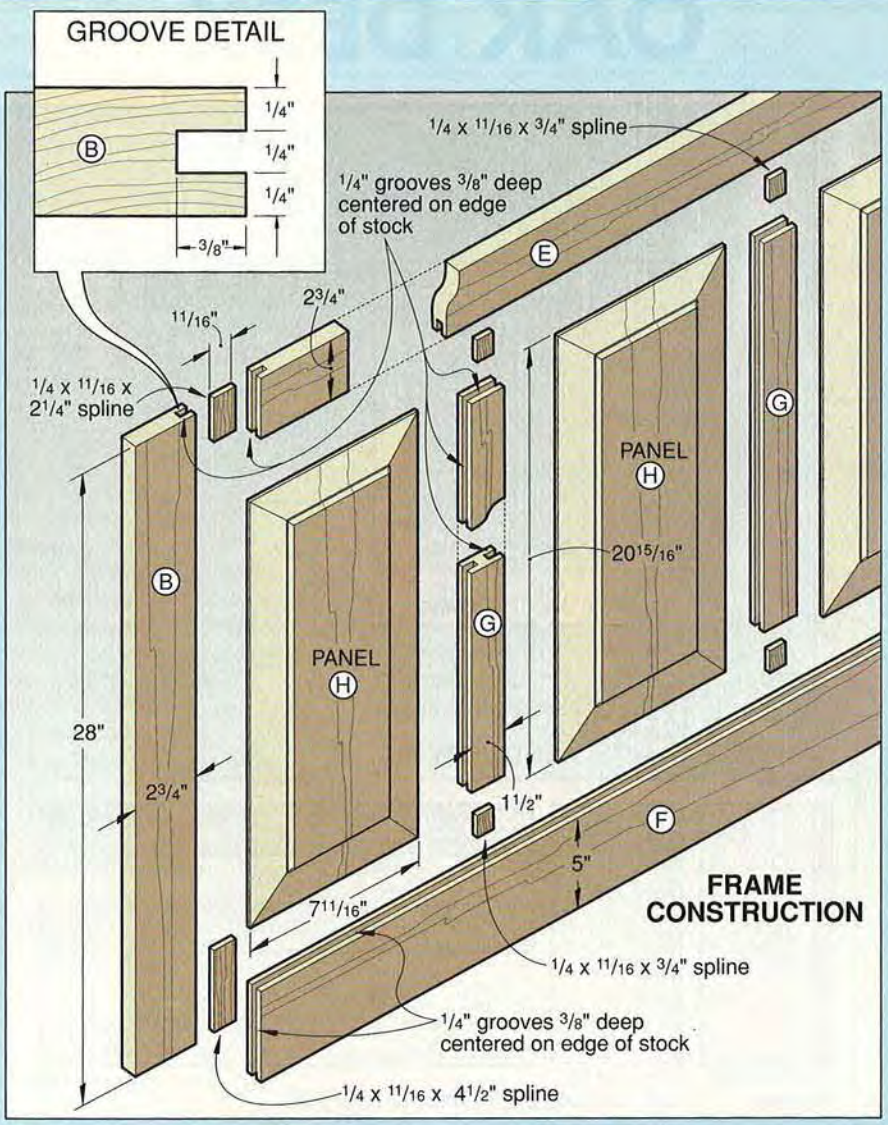
Assemble the drawer unit

1 Cut a couple of corner braces like that shown at *right*.

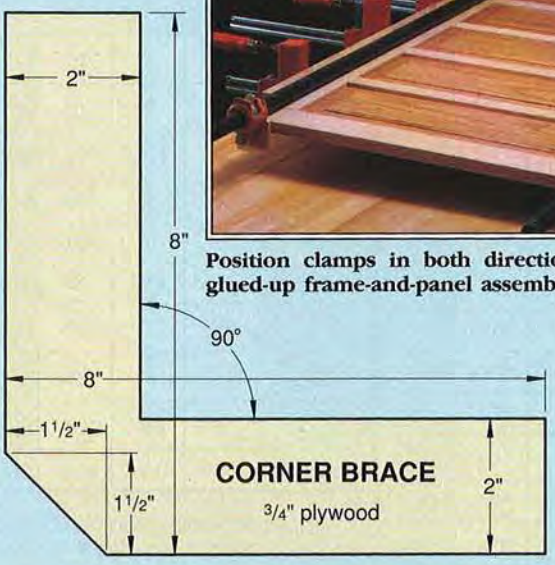
2 Cut the rails (I, J, K) to size. The long rail (K) should measure 1½" less than the overall length of the front frame. For proper fitting drawers and slides later, be careful to cut the short rails to the exact length listed in the Bill of Materials.

3 Glue and clamp the rails (I, J, K) in place where shown on the drawing titled Assembling the Frames and the Exploded View drawing. Use the corner braces cut in step 1 to help hold the assembly square. Drill countersunk mounting holes, and screw the rails in place (see the Screw-Hole

Continued

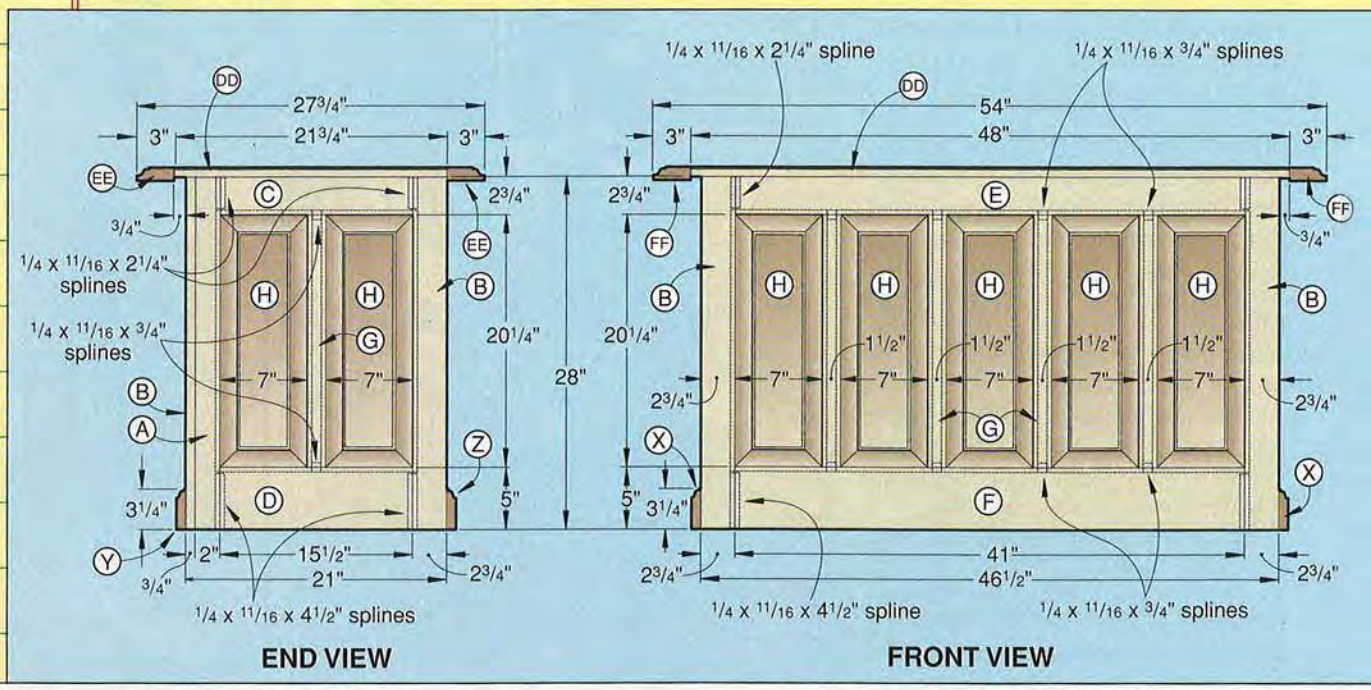


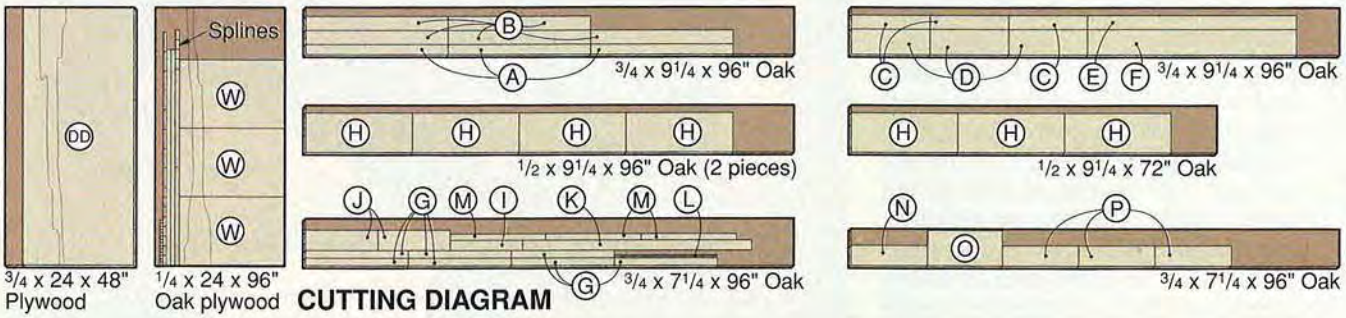
Position clamps in both directions, and bring together the glued-up frame-and-panel assembly.



DOWN-TO-BUSINESS

OAK DESK




Splines
3/4 x 24 x 48" Plywood
1/4 x 24 x 96" Oak plywood
3/4 x 91/4 x 96" Oak
1/2 x 91/4 x 96" Oak (2 pieces)
3/4 x 71/4 x 96" Oak
3/4 x 91/4 x 96" Oak
1/2 x 91/4 x 72" Oak
3/4 x 71/4 x 96" Oak
CUTTING DIAGRAM

Bill of Materials

Parts	Finished Size T	W	L	Matl.	Qty.
FRAME-AND-PANEL ASSEMBLIES					
A stiles	¾"	2"	28"	RO	3
B stiles	¾"	2¾"	28"	RO	5
C top rails	¾"	2¾"	15½"	RO	3
D bottom rails	¾"	5"	15½"	RO	3
E front top rail	¾"	2¾"	41"	RO	1
F bottom top rail	¾"	5"	41"	RO	1
G mullions	¾"	1½"	20¼"	RO	7
H panels	½"	7 11/16"	20 15/16"	RO	11
I top rail	¾"	2"	14¼"	RO	1
J bottom front rails	¾"	4"	14¼"	RO	2
K top rail	¾"	2"	45"	RO	1
L filler strip	¼"	¾"	20¼"	RO	1
M cleats	¾"	1¼"	18¾"	RO	3

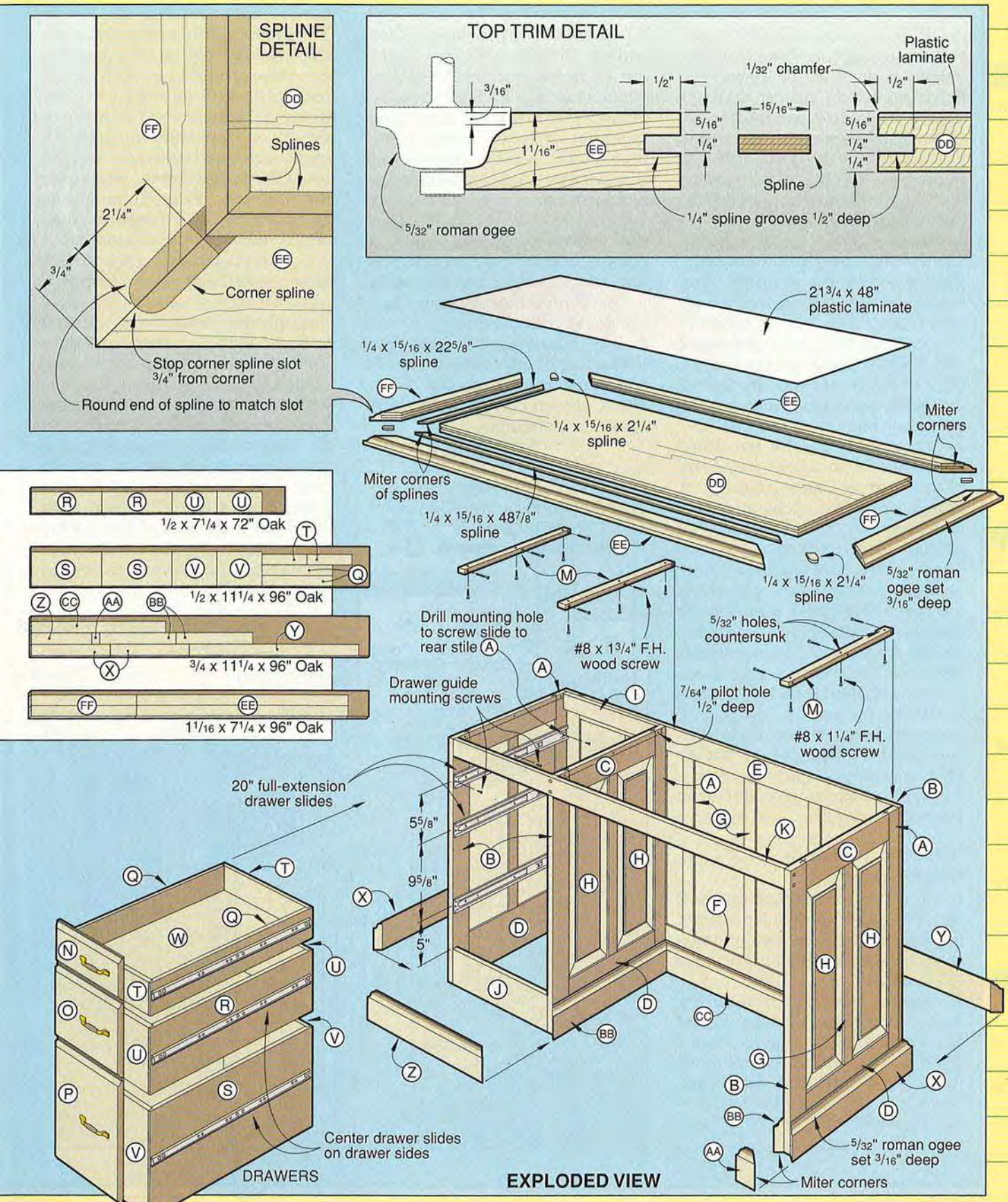
Parts	Finished Size T	W	L	Matl.	Qty.
DRAWERS					
N top front	¾"	4"	15"	RO	1
O middle front	¾"	7"	15"	RO	1
P bottom front	¾"	11½"	15"	RO	1
Q sides	½"	3"	20"	RO	2
R sides	½"	6"	20"	RO	2
S sides	½"	9¾"	20"	RO	2
T front & back	½"	3"	12¾"	RO	2
U front & back	½"	6"	12¾"	RO	2
V front & back	½"	9¾"	12¾"	RO	2
W bottoms	¼"	19½"	12¾"	OP	3

*Initially cut these parts oversized. Then, trim each to finished size according to the how-to instructions.

Parts	Finished Size T	W	L	Matl.	Qty.
BASE TRIM					
X* sides	¾"	3¼"	22½"	RO	2
Y* front	¾"	3¼"	48"	RO	1
Z* back	¾"	3¼"	17¼"	RO	1
AA* end	¾"	3¼"	2¼"	RO	1
BB* insides	¾"	3¼"	21"	RO	2
CC* inside	¾"	3¼"	30"	RO	1
TOP TRIM					
DD top	¾"	21¾"	48"	P	1
EE trim	1 1/16"	3"	54"	RO	2
FF trim	1 1/16"	3"	27¾"	RO	2

Materials Key: RO–red oak, OP–oak plywood, P–fir plywood

Supplies: 1¼"×#17 brads, #8×1¼" flathead wood screws, #8×1¾" flathead wood screws, 22¾×49" plastic laminate, contact cement, stain, clear finish.


SPLINE DETAIL
DD
FF
Splines
EE
2 1/4"
3/4"
Corner spline
Stop corner spline slot 3/4" from corner
Round end of spline to match slot
TOP TRIM DETAIL
3/16"
1/2"
1/32" chamfer
Plastic laminate
15/16"
5/16"
1/4"
1 1/16"
EE
Spline
DD
5/32" roman ogee
1/4" spline grooves 1/2" deep
21 3/4 x 48" plastic laminate
1/4 x 15/16 x 22 5/8" spline
FF
EE
1/4 x 15/16 x 2 1/4" spline
Miter corners
Miter corners of splines
DD
1/4 x 15/16 x 48 7/8" spline
FF
5/32" roman ogee set 3/16" deep
1/4 x 15/16 x 2 1/4" spline
M
#8 x 1 3/4" F.H. wood screw
5/32" holes, countersunk
Drill mounting hole to screw slide to rear stile A
A
I
7/64" pilot hole 1/2" deep
M
#8 x 1 1/4" F.H. wood screw
Drawer guide mounting screws
20" full-extension drawer slides
C
E
A
B
G
K
5 5/8"
B
H
C
A
9 5/8"
H
X
F
H
H
Y
5"
D
J
D
CC
BB
G
B
X
BB
D
Z
AA
5/32" roman ogee set 3/16" deep
Miter corners
R R U U
1/2 x 7 1/4 x 72" Oak
T
S S V V
Q
1/2 x 11 1/4 x 96" Oak
Z CC AA BB
Y
X
3/4 x 11 1/4 x 96" Oak
FF EE
1 1/16 x 7 1/4 x 96" Oak
Q T
Q
W
N
U
T
R
O
U
V
P
S
V
Center drawer slides on drawer sides
DRAWERS
EXPLODED VIEW

OAK DESK

detail). Cut plugs, plug the holes, and sand the plugs flush with the outside surface of the stiles.

4 For a flush fit against the back side of the front frame, cut the filler strip (L) to size. Glue the strip to the back edge of the stile (A) belonging to the middle frame where shown on the Assembling the Frames drawing.

Complete the desk carcase

1 Being careful not to mar the surfaces, glue and clamp the drawer unit to the back face of the front frame. Keep the top and bottom edges flush, and keep the outside edge of the front frame flush with the outside surface of the drawer-unit end frame.

2 Glue and clamp the remaining end frame to the front frame, using the corner braces to keep the frames square to each other. Immediately secure the top rail (K) in place to help keep the assemblies square. Drill counterbored holes, and fasten the top rail to the remaining end frame. See the Screw-Hole detail accompanying the drawing titled Assembling the Frames for reference.

3 Now, cut the cleats (M) to size. Drill the mounting holes, and glue and screw them to the end and middle frames where shown on the Exploded View drawing.

4 Scrape off excess glue, and sand the joints smooth.

It's time to add a trio of drawers

1 Using the Drawer Construction and Exploded View drawings and the Bill of Materials, cut the drawer fronts (N, O, P) to size from ¾"-thick oak.

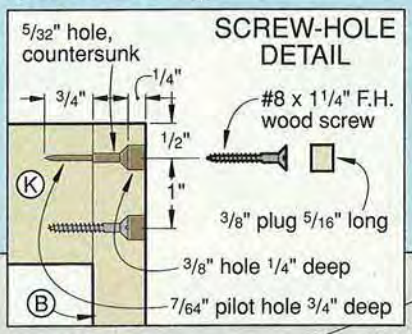
2 Fit your router with a 5/32" roman ogee bit, and rout along all four edges of each drawer front.

3 From ½" oak, cut the drawer sides (Q, R, S), and fronts and backs (T, U, V). Next, from ¼" oak plywood, cut the drawer bottoms (W) to size.

4 Cut or rout ¼" grooves ¼" deep and ¼" from the bottom edge of the ½" fronts and backs (T, U, V) and sides (Q, R, S). Next, machine ½" rabbets ¼" deep along the front and back ends of each drawer side. See the Drawer Construction drawing for reference.

5 Glue and clamp each drawer (minus the fronts–N, O, P). Check each corner for square, and adjust clamps accordingly. You'll position and add the drawer fronts later after the drawers have been installed on the slides.

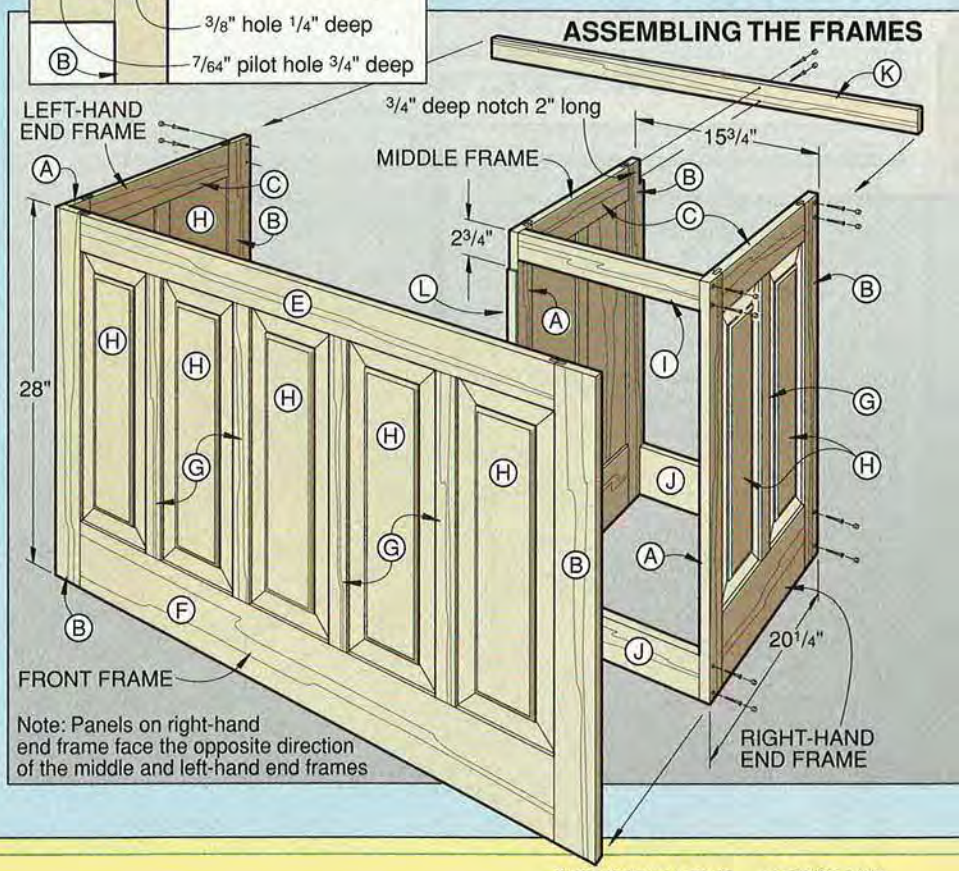
6 For mounting the pulls later, drill a pair of mounting holes centered on the front of each drawer where shown on the Drawer Construction drawing.



7 Using the dimensions on the Exploded View drawing, mark the drawer-slide locations (centerlines) on the inside face of the drawer unit. See the Buying Guide on the *opposite* page for our source of hardware, and review the directions supplied with the slides for detailed mounting instructions. Drill the pilot holes, and screw the slides in place.

To mount the back end of each slide to the back stiles (A), you'll have to drill a mounting hole through the metal slides and into the stiles. The existing rear-most hole in the slide comes too close to the front edge of the rear stile (A). Screws driven this close to the edge can split the stile.

8 Drill the mounting holes, and fasten the mating portion of each drawer slide centered on the drawer sides (Q, R, S) and flush with the front end of the drawer box. Check the fit of all three drawers in the drawer unit, and adjust the slides if necessary.



Next, add the base trim

1 Using ¾" oak, rip two 96"-long pieces and one 48"-long piece to 3½" wide for the base trim. See the Cutting Diagram for reference.

2 Using a 5/32" roman ogee bit mounted in your router, rout an ogee along one edge of all three trim pieces. See the Top Trim detail accompanying the Exploded View drawing for reference. Sand the routed ogee smooth.

3 Miter-cut the base trim pieces (X, Y, Z, AA, BB, CC) to length. Glue and clamp the pieces to the desk base where shown on the Exploded View drawing.

4 With the drawers in place on the slides, and leaving a 5/8" gap between the top edge of trim piece Z and the bottom edge of the bottom drawer front P, drill pilot holes in the back face of P, and fasten the bottom drawer front to the bottom drawer assembly. Leaving an equal gap (1/8"), fasten the two remaining drawer fronts to their respective drawers.

And now for the desktop

1 From ¾" fir plywood, cut the desktop substrate (DD) to size.

2 Cut a piece of plastic laminate (we used Formica #302, Russet Oxide) to the size of the substrate plus 1" in length and width. Using contact cement, center and adhere the plastic laminate to the top of the substrate.

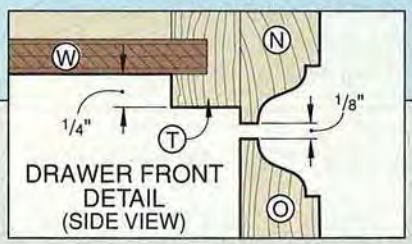
3 Fit your router with a flush-trimming bit, and rout the edges of the laminate flush with the edges of the substrate.

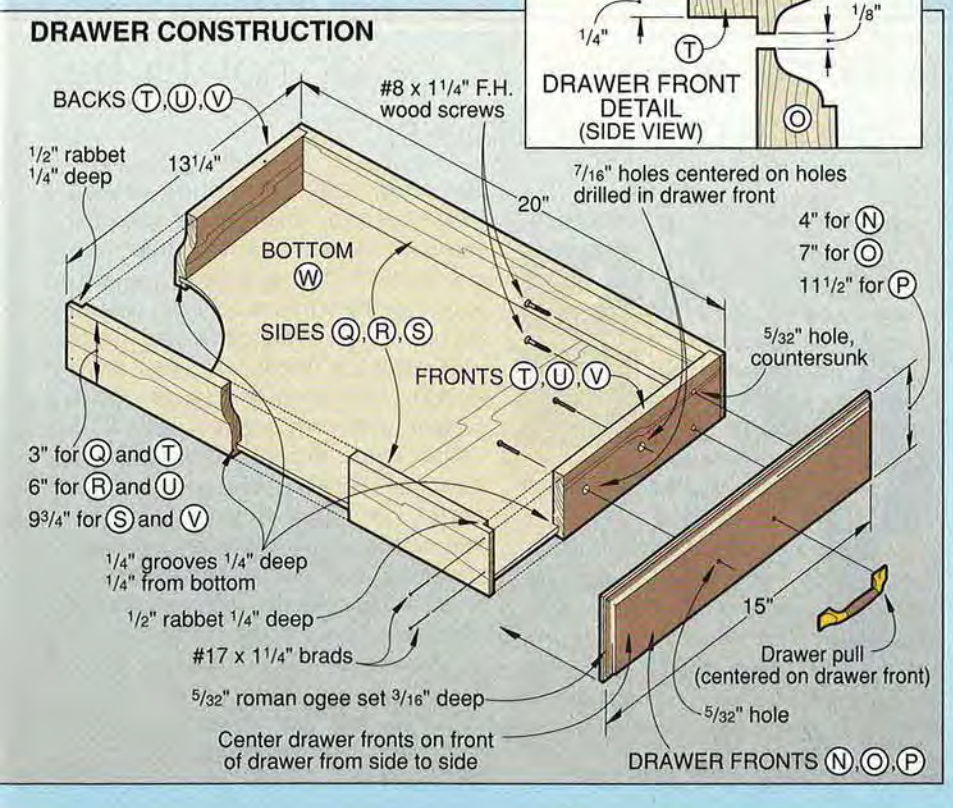
4 Rout a 1/32" chamfer along the top four edges of the laminate where shown on the Top Trim detail accompanying the Exploded View drawing.

5 Rip and miter-cut the desktop trim pieces (EE, FF) to size.

6 Fit your router with a ¼" slotting cutter. Rout ¼" grooves along the edges of the plywood substrate and along the inside edges of the trim. See the Top Trim detail for reference. Then, rout 2¼"-long stopped-spline grooves along the mitered ends of the trim where shown on the Spline detail accompanying the Exploded View drawing.

7 From ¼" stock, cut 15/16"-wide splines to the lengths listed on the Exploded View drawing. Round the ends of the splines that fit between the mitered ends of the trim. Glue and spline the trim pieces to the plywood substrate.




DRAWER CONSTRUCTION
BACKS T,U,V
#8 x 1 1/4" F.H. wood screws
1/2" rabbet 1/4" deep
13 1/4"
20"
7/16" holes centered on holes drilled in drawer front
4" for N
7" for O
11 1/2" for P
BOTTOM W
SIDES Q,R,S
FRONTS T,U,V
5/32" hole, countersunk
3" for Q and T
6" for R and U
9 3/4" for S and V
1/4" grooves 1/4" deep 1/4" from bottom
1/2" rabbet 1/4" deep
#17 x 1 1/4" brads
5/32" roman ogee set 3/16" deep
Center drawer fronts on front of drawer from side to side
15"
Drawer pull (centered on drawer front)
5/32" hole
DRAWER FRONTS N,O,P

Sand and finish your good-looking desk

1 Mask the laminate top. Finish-sand the trim. Finish-sand the base unit.

2 Remove the drawer slides from the drawer sides.

3 Stain as desired (we used Wood Kote Danish Walnut). If you use the same pulls we did, don't forget to stain the wood on the drawer pulls. Add the finish (we applied several coats of Minwax fast-dry satin polyurethane).

4 Reattach the slides and add the pulls. If you want file holders (see the Buying Guide), cut the hanging holders to length and install them along the top edges of the bottom drawer. Position the desktop on the base unit where located on the End View and Front View drawings. Drive screws through the previously drilled holes in the cleats to secure the two together.

Buying Guide

• **Desk hardware.** Three pair of 20" full-extension box drawer slides, 3–medium antique English pulls, two 24" pieces of white styrene folder holder. Stock no. 88056, $64.95 ppd. The Woodworkers' Store, 21801 Industrial Blvd., Rogers, MN 55374-9514. Or call 612-428-3200 to order.

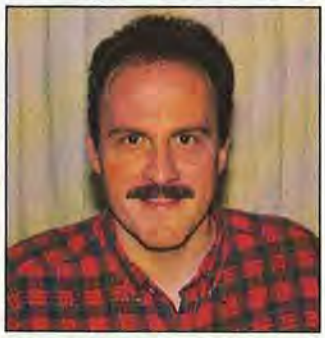
Produced by Marlen Kemmet
Project Design: James R. Downing
Photographs: Perry Struse
Illustrations: Kim Downing

Print this article

CAN YOU CUT IT? WOODWORKING

You've read about former hobbyist woodworkers—and probably know a few—who now make money with their skills turning out furniture, toys, bowls, and other projects. Is that the life for you? Can you take the big step? For answers to such questions, we turned to an expert.

Jack Neff, a freelance journalist from Batavia, Ohio, did hundreds of hours of interviews for his book *Make Your Woodworking Pay For Itself.* (Published in 1992 by Writer's Digest Books, Cincinnati, Ohio, it sells for $16.95 at bookstores.) Chapter after chapter, Jack takes the reader from startup to marketing, to taxes and money management. Jack starts his book with perhaps your biggest decision—whether to remain a woodworking hobbyist or try to make money.



Journalist Jack Neff

Are you cut out for business?

During his research, Jack talked to dozens of woodworkers who make money with their skills. For most of them, the transition to profit was gradual.

"It seems as if the majority of people start out with it as a hobby," says Jack. "Then they try to make a little money from it—just as a hobby—before they go into it as a full-blown business." But if you're still in the hobby stage, he believes you must ask yourself some serious questions before taking the plunge.

"Do you want woodworking to supplement a retirement income," he asks, "or become a full-time job? What you decide dictates the direction you need to go." And lurking within those questions lie some very important considerations that might affect your choice, particularly if you are near retirement age.

"For instance, under social security rules," he adds, "there is a dollar ceiling to the income you can make over and above your social security payments [for 1993, $7,600 annually if you're under 65; $10,560 a year if you're 65 or over]. Those ceilings—and they change each year—could dictate the approach you take. Too, some early retirement plans may have similar restrictions on income."

And there's always the question of time. Just how much of it do you want to spend?

"There really are some hassles to owning a business," says Jack.

A taxing question: To be or not to be a woodworking business?

If you turn your woodworking hobby into a business for tax purposes, you can claim some deductibles from your annual income. For instance, you could write off professional seminars and deduct overhead such as a portion of your mortgage, heat, power, and property tax bills (because rules are changing, check current IRS regulations). You could even buy new woodworking tools, and then depreciate them over the next five years or write off the entire amount in the year you bought them.

"As a hobbyist, the only way to justify a tool purchase and write it off is to purchase it for a specific job [that you're doing for profit]," Jack explains. "But then you

AS A BUSINESS

"For one thing, the amount of time it takes to do the paperwork. Then, there's the actual selling. If you want to just sell an occasional item to friends, it's not going to take much time compared to what you have to spend on marketing if you're really going to push for a profit. For example, one of the areas that a lot of people start out in—even if they don't end up doing that forever—is going to crafts fairs.

"That can be incredibly time-consuming," he continues. "First, the fairs usually take an entire weekend. Then there's travel time and expense. And for many, having constant interaction with people over a few days is not what they got into woodworking for."

can only write off the time you actually used it for that job—and there is no other way you can use that tool for another job. If you do, the tool would be judged [by the Internal Revenue Service] as something you bought for personal enjoyment—for your hobby—and not exclusively for your woodworking business."

How do you become a business? According to Jack, there are several criteria that the IRS uses, but the main one deals with your track record. "If you have been charging for your woodworking for five consecutive years, and you can demonstrate that you made a profit in three of those years," he says, "the IRS assumes that you are operating a business."

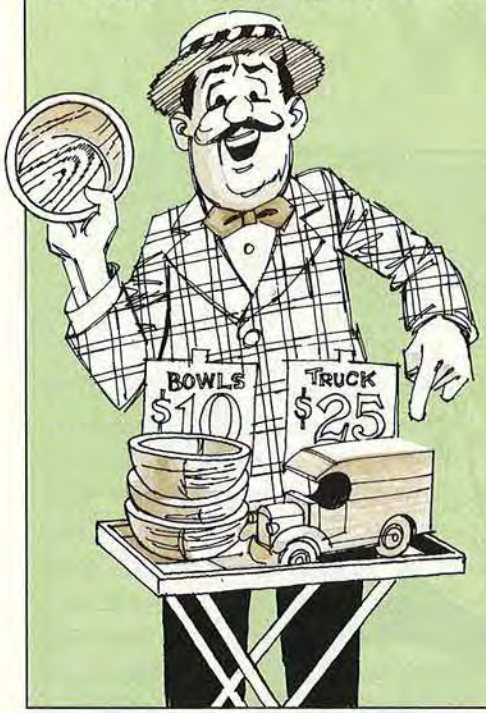
You do, though, have an alternative approach. Jack explains: "You don't necessarily have to become a business even if that criterion fits, as long as you're claiming any profit you make under miscellaneous income on your form 1040. That means it's still possible to be a hobbyist and run a money-making operation. You just can't take all the legal tax deductions from your gross income that a business could.

"You get into trouble," Jack comments, "when you consistently report losses from what you call a woodworking business and take those losses as deductions against other income. That's when the IRS is most likely to blow the whistle and say 'You're not a full-fledged business; this only qualifies as hobby income.' "

Zoning, although it has little bearing on taxes, also can be a deciding factor in what you do, according to the book author. "If you're not woodworking for money, you can run all the power tools you want," notes Jack, "unless of course you run across a local noise ordinance. But if you're woodworking for money and it bugs your neighbors, you could have a problem. Municipal and county zoning ordinances vary so much that it's hard to generalize, but the rule of thumb is—'No harm, no foul.' That is, as long as your neighbors don't complain, no zoning inspector will pop in to see if you are running a business."

Continued

How to market what you make



As a hobby woodworker, what you make in your shop and how you make it is up to you. But to turn a profit, you'll need a good infusion of marketplace wisdom.

"You don't really find somebody just going out and looking around to see what sells or what might be the most profitable item, and then start making it," Jack observes. "A business most always starts with something that somebody likes to do or has done with success. Then, after testing the waters with their product, they refine it. And perhaps the best way to do that is at a crafts fair because there you have thousands of people coming by. You can see what appeals to folks, learn the competition, and determine what your product should sell for. It's a good way to cut your teeth."

In his book, Jack provides a calculation for determining a product's price based on overhead, time, labor, materials, and your pay. He admits, though, that it's just a formula to begin with. "Price always comes down to what the market will bear and what other people charge," he says. "That's where crafts fairs come in: You can come up with calculations for making a profit, but if other people are selling basically the same thing for less, then you won't sell any. And in the craft market, you'll find hobbyists who aren't necessarily looking at it from a profit-and-loss standpoint. They just want to recoup some of the money that they spend on their hobby."

In his explorations into the business side of woodworking,

"It's tough out there, but I could never work for anyone else again."

—Hank Gorczynski, toymaker

For more than 20 years, Hank Gorczynski has made a living from toys he makes in his Batavia, New York workshop. He sells at crafts fairs throughout the year. (We featured Hank and his work in the August 1992 issue of WOOD® *magazine.) Here, he offers some pull-no-punches observations on making a living from selling his creations.*

Hank started out making simple pine vehicles. Now he builds collector's items. Woodworking lured him away from a fulltime job as a shipping supervisor.

"The most difficult part is getting into top-notch, juried fairs. If you can't get into them, you can't make a living at this today. And the exhibit fee for a top-notch one will run at least $400. With that, you're talking at least $1,000 cost per weekend. We're coming out of a recession, but at a recent crafts fair I went to—it used to be one of my best—I only took in $1,508 for four days!

"It's tough out there, but all the same, after 21 years of this I could never work for anyone else again. I love what I do. I like my freedom, but I can't recommend the crafts-fair circuit as a way to make a living. If you want to try it, do some local shows first, then feel your way along. And never buy any new tools until you really need them. Get by with what you have. In the meantime, don't even think about it fulltime unless you've got a pension check or other supplemental income coming in every month."

Jack also has found an interesting contradiction about marketing. "Lower-priced items of $25 and less sell best at crafts fairs. But if you're not a mass producer, you can't make a profit on them. So if you like to painstakingly handcraft items," he advises, "choosing bigger-ticket ones—and maybe even finding other outlets, such as galleries—may ultimately work best for you."

Jack has other suggestions when it comes to marketing your work. Regarding shops, for instance. "If you're just starting out with no track record and plan to work with the retail trade, make them an offer they can't refuse, such as consignment [you only get paid when it's sold, and give the shop a commission]." he says. "Then, as you develop a reputation with shops for making products that people buy, it becomes easier to get some payment from them up front or net 30 days [price less discount in a month].

"Another good way to sell is by commission," Jack adds, "but you must be an established craftsman. You also can try having craft parties in your home." For more selling advice, see the box *right.*

But of all the advice Jack can pass along from those who have successfully made the transformation from hobbyist to professional, he likes one piece the most. "The main thing is to start out and stay with what you like to do and what you know best," he says. "That's what virtually everybody who's successful selling their craft does because it keeps the enjoyment in it."

TIPS
How to sell like the pros

- Make limited editions (25–50) of smaller items and number them. Also sign or brand what you make.
- Build an attractive booth or display. Pros say it can account for 25 percent of sales.
- At crafts fairs, take the time to talk to customers and explain what makes your product so very special.
- Tag your work with a business card, or include one in the wrapping when you make a sale.
- If possible, keep a sales' log of customers. From this develop a mailing list to market new products or stimulate later sales.

"You'll never know if you can do it until you try."

—Jim Watson, furniture restorer

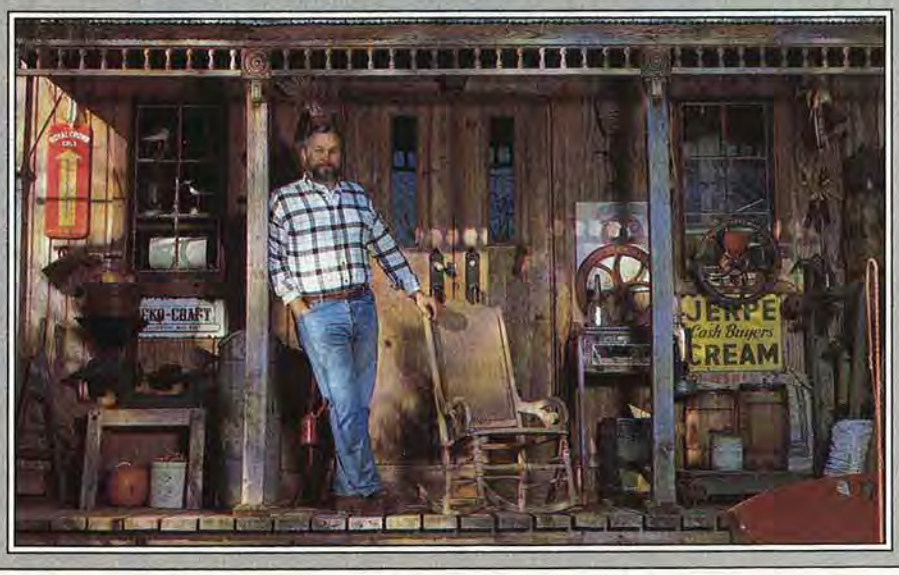
It was about 10 years ago that Jim Watson of Huntsville, Arkansas, took the step and set up shop as a full-time furniture restorer. Now, he has to turn away business. (We visited Jim in the December 1990 issue of WOOD® *magazine.) Here he tells about how it was to make the move from hobbyist to professional.*

"I always wanted to quit my job, but I was scared to. Yet, there was quite a bit of demand for restoring furniture, so I said to myself 'You'll never know unless you try it.' But basically, when you get more work than you can do, that's telling you something.

"I got to figuring how much work I was doing and how much I was turning down [as a hobby], and got the picture that the opportunity was there if I did good work. The biggest adjustment for me was not getting a paycheck every two weeks. And a lot of people can't handle that. But the work was there and still is.

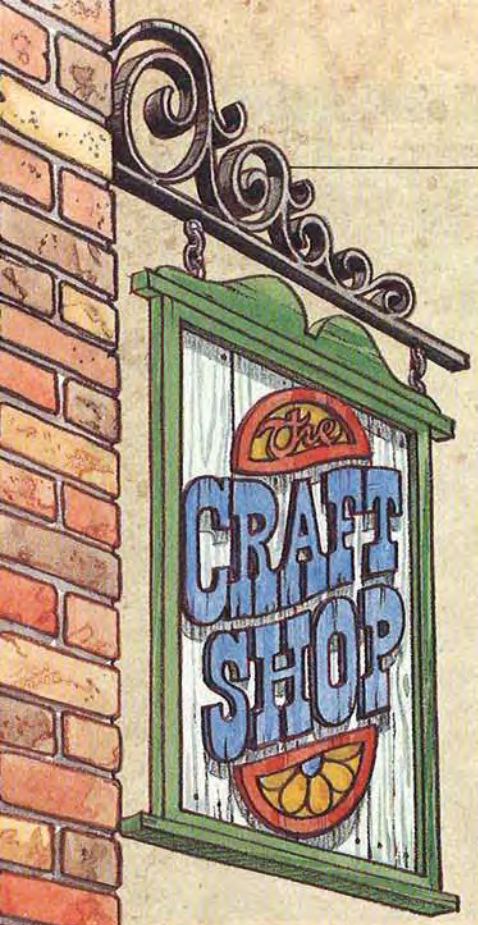
"At first, though, for about a year, I took some jobs that I really didn't like. Now I'm to the point where I can pick 'em. There seems to be a demand [for restoration] no matter where you're at.

"But you got to remember that, when you run your own business, you have to be everything. You got to do the PR, the advertising, everything. It's still fun, but it was really fun when I did it for a hobby. This own-your-own-business stuff is serious."



Folks from far and near with furniture that needs restoring seek the help of Jim Watson. From the beginning, he built a reputation by doing good work.

Written by Peter J. Stephano Illustrations: Jim Stevenson Photographs: Glenda Neff, Jerry Irwin, Bob Hawks



ONE-STOP CHOPPING

Print this article

Whether slicing open a couple of hoagie rolls, cutting up a few mushrooms, or serving a loaf of nutbread, any cook will love this little cutting board. As a bonus, it features a slot that holds a knife securely in place with magnets.

***Note:** You'll need stock ⅜×6×24", ⅜×5×18", and a contrasting piece ¼×3¼×12". We resawed and planed ash for the ⅜" stock, and cherry for the ¼" material. Our knife slot fits a Farberware 8" bread knife purchased at Kmart. Modify the cavity to fit your knife, if necessary.*

Joint one edge of each piece of stock. For part A, rip the 18"-long piece 3¼" wide from the jointed edge. Crosscut the cut-off piece to 12" long for part B.

Crosscut the ¼"-thick stock in half for parts C and the 24"-long piece for parts D. Ensure that the sawed end of each piece is square to the jointed edge. Mark the square end on each.

Now, start by assembling the handle. Lay part A on the workbench, with the jointed edge away from you. Lay one part C on top of it at the right end, jointed edge away from you, square end to your left. Align the top edges flush, then glue and clamp.

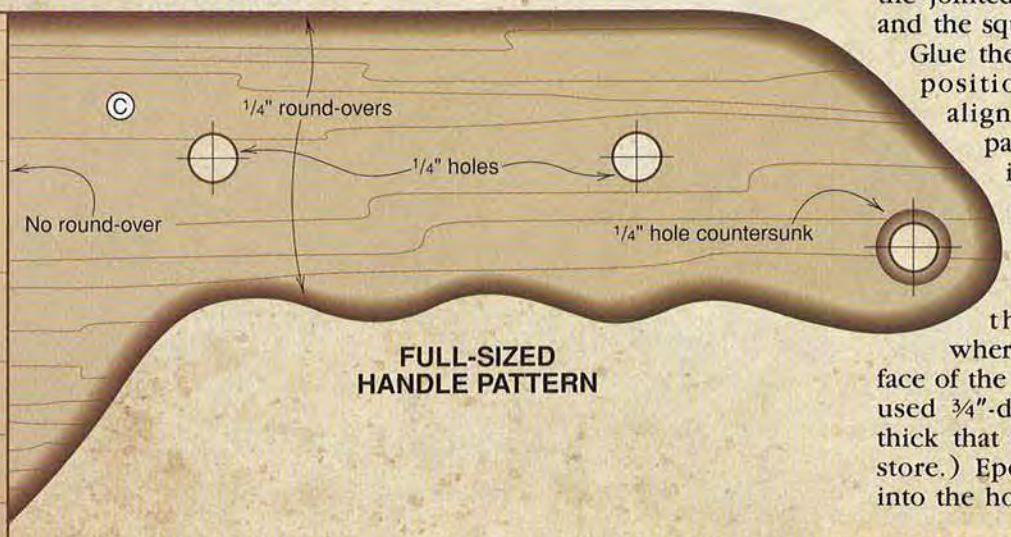
Glue the remaining part C to the opposite face of part A, aligning the square ends of both parts C. (We used a try square to align the top and bottom corners.)

Trace the Full-Sized Handle Pattern onto part C. Align the pattern's top with the edge and its front with the square end. Bandsaw along the pattern line.

Back the handle with scrapwood, and drill the three ¼" holes where shown with a drill press. Countersink the hanging hole for appearance. Glue ¼" dowels into the other two holes. Saw the dowel ends off flush. Round over the handle edges where shown with a ¼" round-over bit and a table-mounted router. Then, sand all surfaces smooth.

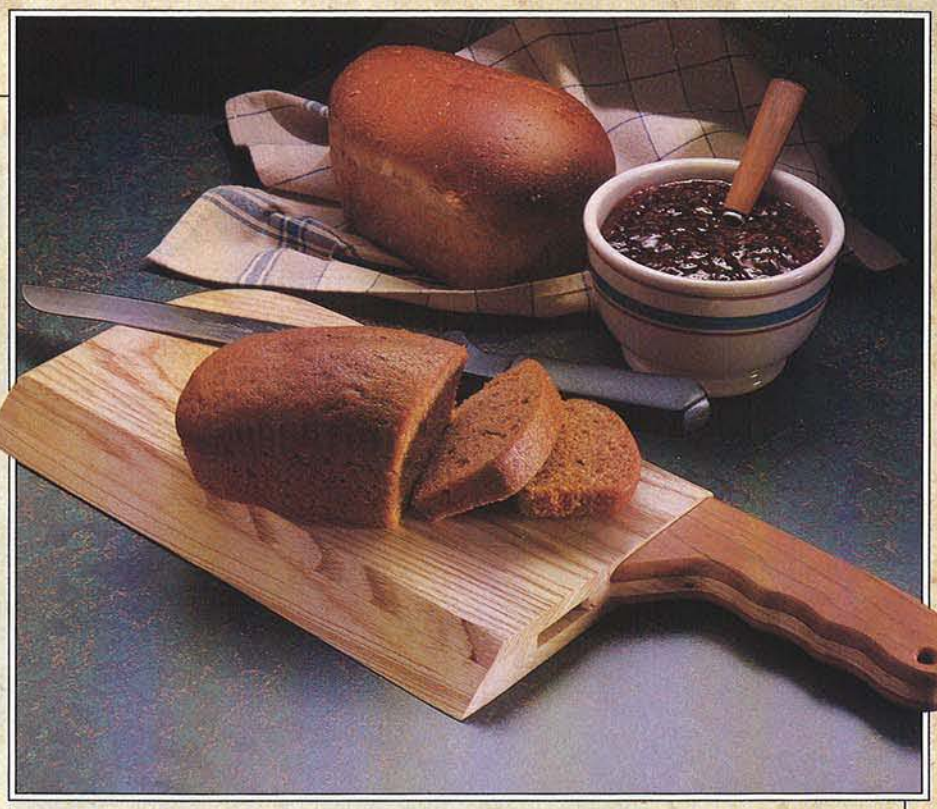
With the handle completed, build the cutting board. Lay one part D on the workbench with the jointed edge away from you and the square end to your right. Glue the handle assembly into position where shown by aligning the top edges of parts A and D, and butting the end of part D against part C. Now, glue part B to part D where shown.

Mark and bore the three magnet holes where shown on the inside face of the remaining part D. (We used ¾"-diameter magnets 3⁄16" thick that we bought at a crafts store.) Epoxy-glue the magnets into the holes.



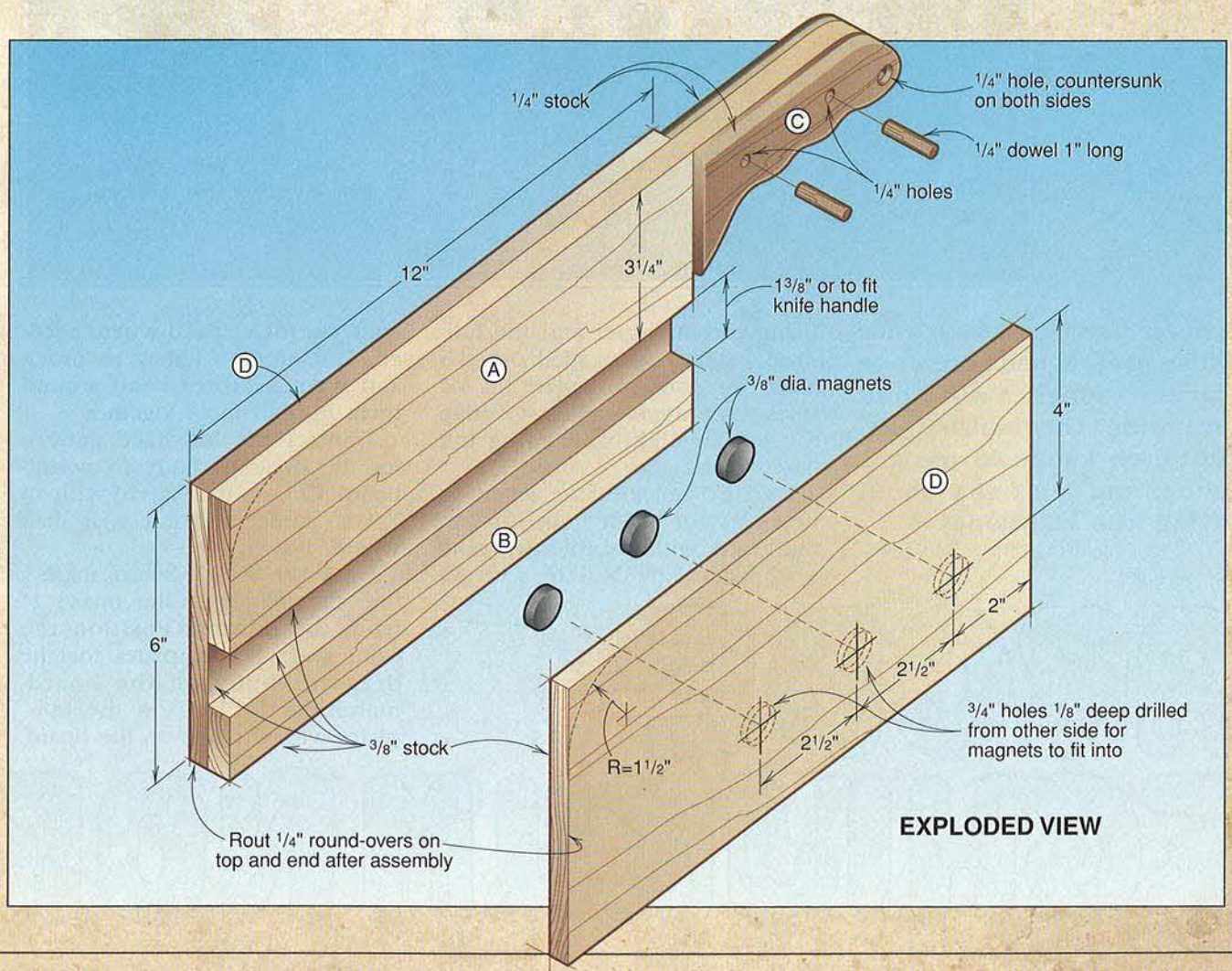
FULL-SIZED HANDLE PATTERN

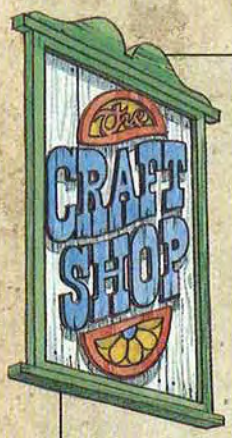
This handy little cutting board packs a knife



Glue the remaining part D in place. Saw the end of the board square, and then bandsaw the rounded corner. Sand the end and top edge smooth, and then rout ¼" round overs along both sides of the end and top. Bevel-rip the bottom to 45°. Sand, and finish with salad bowl oil.

Photograph: Wm. Hopkins
Illustrations: Mike Henry; Kim Downing





Print this article

DRESSER-TOP

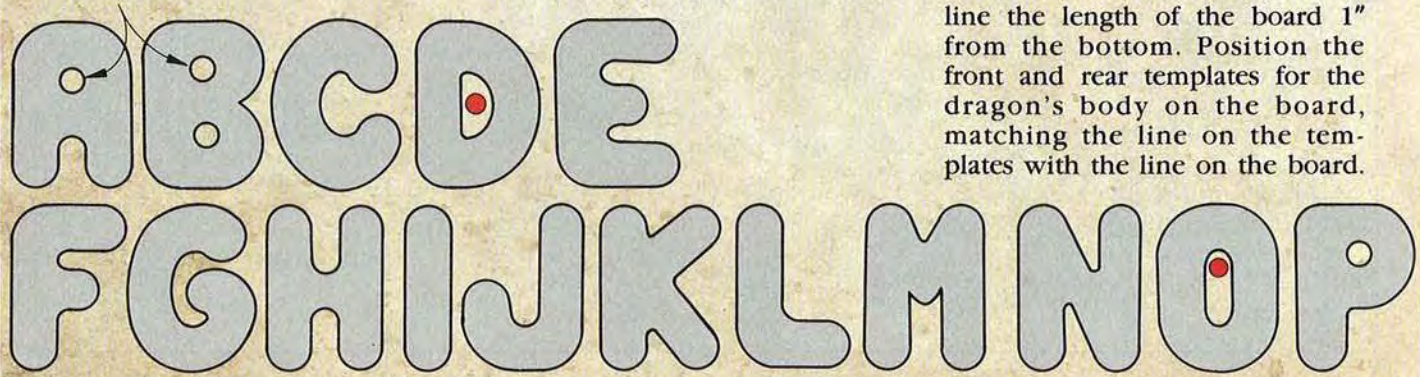
It never hurts to make friends with a dragon, and here's one that any youngster will fall in love with. This amiable serpent even knows its owner's name, and isn't shy about saying who he belongs to.

Using carbon paper and the full-sized letters *below*, spell out the name for your nameplate on ¾" stock (we used maple). Overlap the letters slightly, keeping the baseline straight.

Drill ⅛" holes in the letters as necessary for inside cuts. Cut out the letters with a scrollsaw, using a #7 blade (.043×.016" with 12 teeth per inch). Sand where needed. Line up the letters in order, and wrap a rubber band around them to hold them together.

Transfer the full-sized pattern for the dragon's body to posterboard. Cut out the pattern with an X-Acto knife, and cut it in half where shown.

On a ¾×3×10" board, mark a line the length of the board 1" from the bottom. Position the front and rear templates for the dragon's body on the board, matching the line on the templates with the line on the board.



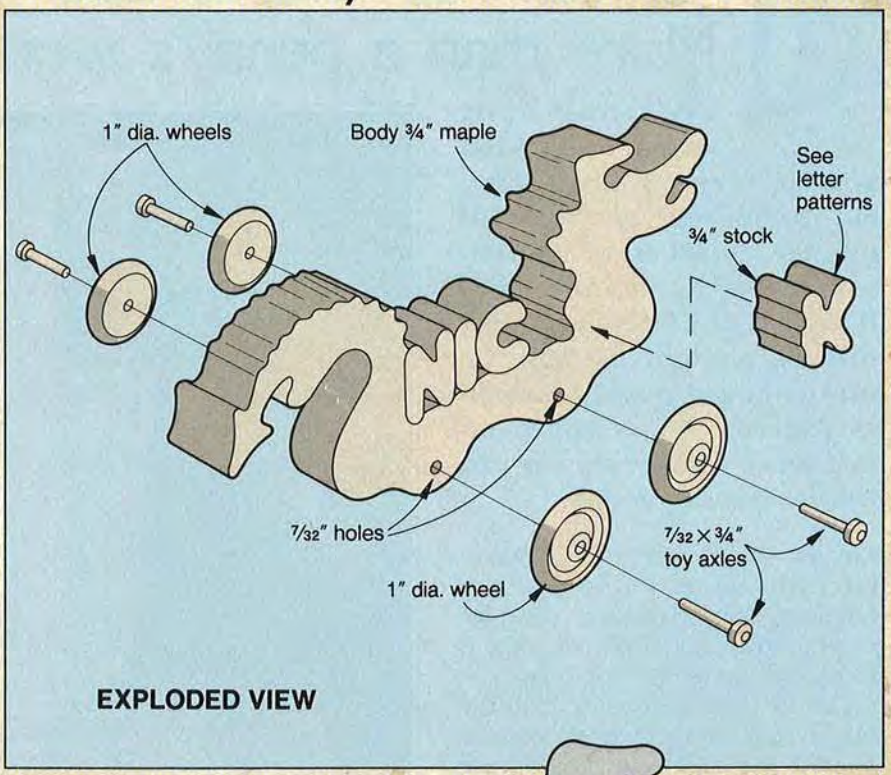
DRAGON

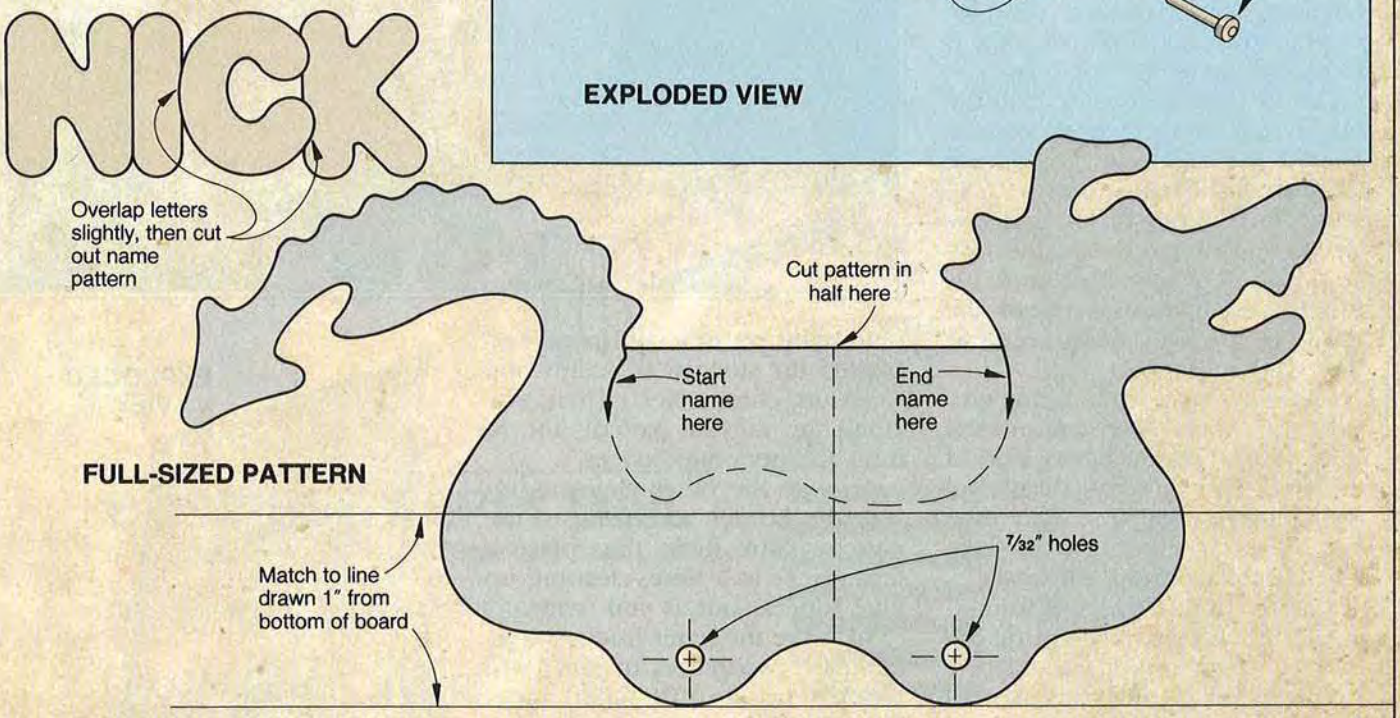
Kids know him by their names

Place the name on top of the templates with the first and last letters aligned where shown. Trace around the body templates and the name, adding additional feet (wheels) to the dragon for names with more than six or seven letters. Space the wheels evenly.

Drill 7/32" holes where indicated, and then scrollsaw the dragon body. Attach 1"-diameter wooden toy wheels to the body with toy axle pegs glued into the holes. Don't pinch or glue the wheels. Apply a clear finish to the dragon body and wheels, and paint the letters with acrylic paints.

Project Design: The Woodshed, B.& C. Willey
Photograph: Wm. Hopkins Jr.
Illustrations: Jamie Downing; Mike Henry




NICK
Overlap letters slightly, then cut out name pattern
Cut pattern in half here
Start name here
End name here
7/32" holes
Match to line drawn 1" from bottom of board
FULL-SIZED PATTERN

SUPERSTAMP

More than a penny's worth of scrollsaw fun

This one-cent stamp won't send a letter very far these days, but you'll sure get a lot of mileage out of it as a scroll-saw pattern. Reader Dick Haughey of Clarendon Hills, Illinois, showed us how he uses enlarged postage stamps as patterns. We whipped up this letter holder so you can try the technique, too.

Cut two 7×8″ pieces of ⅛″ Baltic birch plywood. Photocopy the full-sized stamp pattern, *opposite page*. With spray adhesive, affix it to the good side of one piece.

On the patterned stock, drill the blade start holes where shown. Thread the scrollsaw blade (we used a #4 blade, .033×.014″ with 15 teeth per inch), and saw George Washington's eye and other details. Then, saw around his profile and continue around the inside of the oval area to remove the waste.

Carefully saw around the outside of the oval. Next, cut out the leafy ornaments on either side of the oval. Saw out the details on the concave edge first, and then saw along the other edge to separate the foliage from the waste.

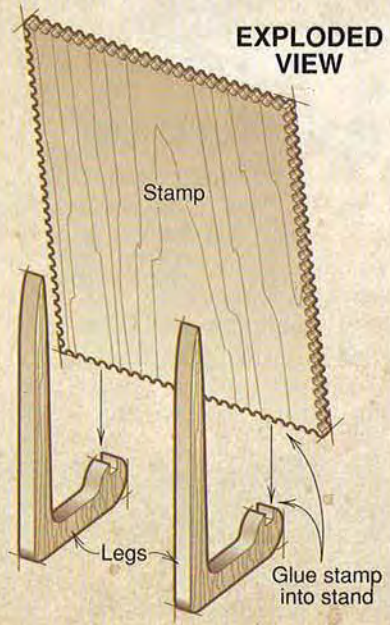
Saw out the letters and numerals, and then complete cutting out the stamp by sawing around the inside of the border. Cut straight lines and square corners for a neat job. Sand as necessary.

Begin assembling the stamp by gluing the cutout border to the remaining piece of wood, matching up the edges. Drill 3⁄16″ holes around the pattern perimeter on the centers indicated. (We used a brad-point bit in a drill press and backed the stock with scrapwood to ensure clean holes.) Then, saw along the outside pattern line to form the perforated edges.

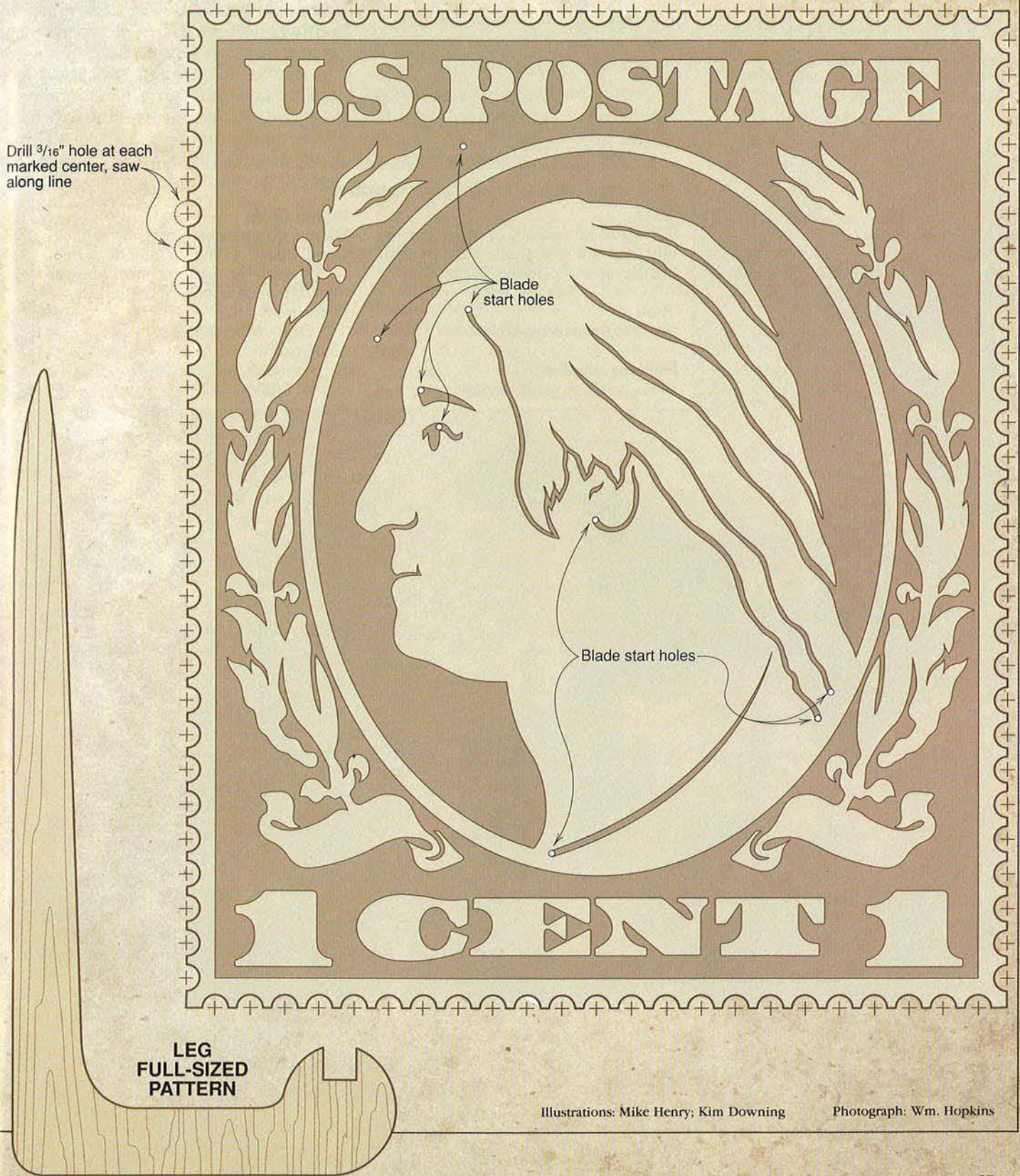
Arrange the other elements inside the border according to the pattern. Glue them into place a few pieces at a time, cleaning up glue squeeze-out as you work.

To make the letter holder's legs, laminate two pieces of ½×3×6″ stock with double-faced tape. Trace the leg pattern onto the top of the stack, and cut around the outline. Cut the slot to fit the stamp tightly. Separate the pieces, and sand.

Glue the stamp into the supports where shown. Finish with clear lacquer.



LETTER HOLDER



Illustrations: Mike Henry; Kim Downing

Photograph: Wm. Hopkins

CARVE A COUPLE

BONE UP ON WHITTLING IN FIVE EASY STEPS

Print this article

You'll be barking up the wrong tree if you try to tell Virginian Bill Loftis that you can't carve. "If you want to, you can," sums up his view of woodcarving. Once you try whittling his hounds, you'll know he's right.

These carved dogs aren't just for show. To woodcarver Bill Loftis of Luray, Virginia, they're also for hunting. "Like many woodcarvers, I'm interested in getting everyone else started in carving," says Bill. And the dog caricatures he carves are just the ticket for flushing out would-be carvers.

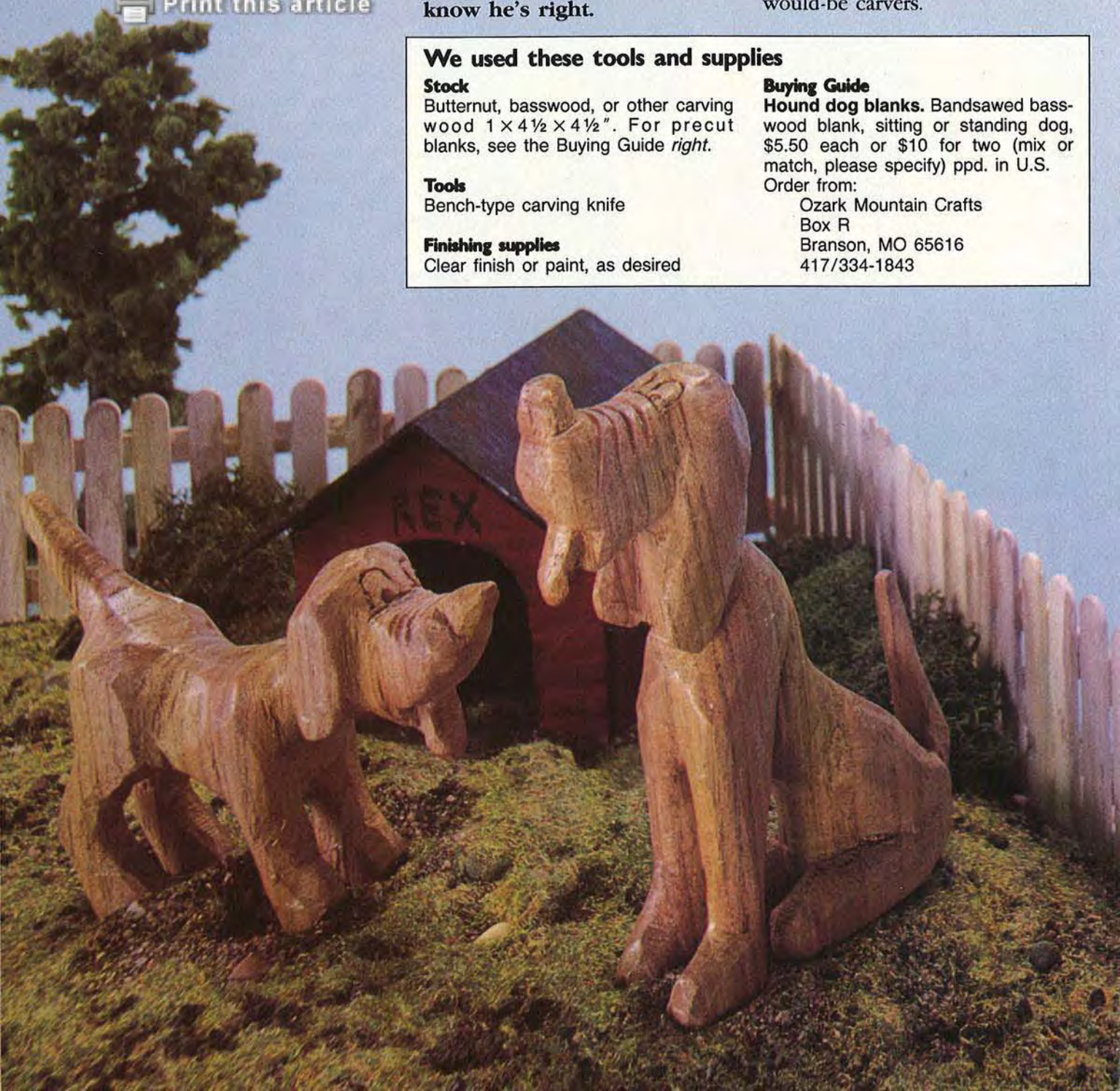
We used these tools and supplies

Stock
Butternut, basswood, or other carving wood 1 × 4½ × 4½". For precut blanks, see the Buying Guide *right*.

Tools
Bench-type carving knife

Finishing supplies
Clear finish or paint, as desired

Buying Guide
Hound dog blanks. Bandsawed basswood blank, sitting or standing dog, $5.50 each or $10 for two (mix or match, please specify) ppd. in U.S. Order from:
Ozark Mountain Crafts
Box R
Branson, MO 65616
417/334-1843



OF HOUN' DAWGS

The undeniable appeal of the carved canines first attracts attention. But what puts the beginning carver into the bag is Bill's five-step carving plan that anyone can follow. Starting with a pattern and working through those simple steps, "anyone with the desire can carve," Bill says flatly.

Even experienced hands will like carving Bill's hounds, though. And because they're small and require only a knife, these dogs make great take-along projects.

STEP 1

Saw your blank. Instead of whittling through a lot of waste wood, most carvers prefer to start with a sawn-out shape called a *blank*.

Blanks for more complicated carvings often are sawed on adjacent sides from two directions—top and side views or side and front views. But for either of these dogs a simple side-view cutout will suffice.

Start by tracing the *red* outline from one of the Full-Sized Patterns, *right*, onto your carving stock. Pay attention to the grain direction shown on the pattern. Saw around the outline with a bandsaw, scrollsaw, or coping saw. (If you don't want to saw your own blank, see the Buying Guide on the *opposite page*.)

STEP 2

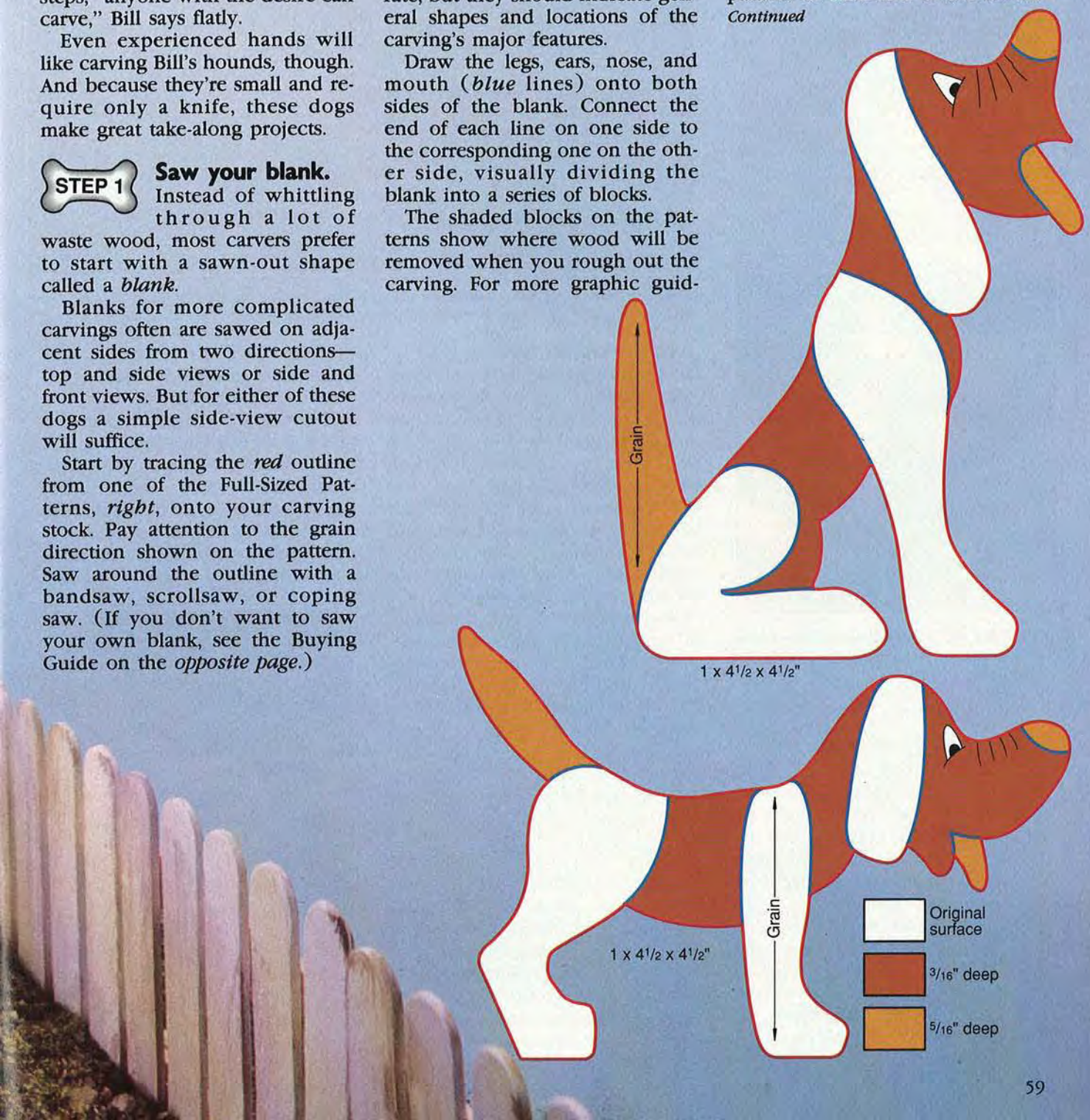
Draw your guidelines. The blank itself doesn't give many clues as to where to carve, so you'll need to draw guidelines on it. The lines don't need to be draftsman-accurate, but they should indicate general shapes and locations of the carving's major features.

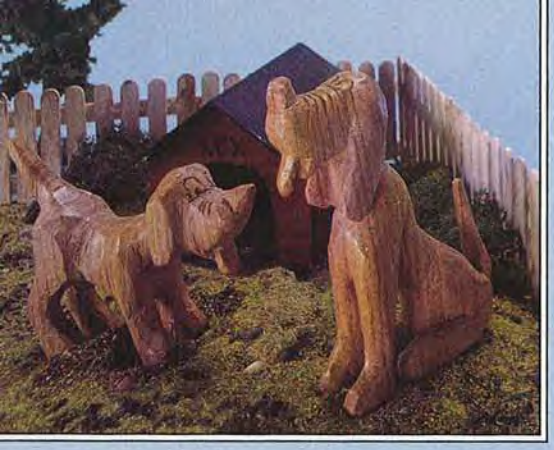
Draw the legs, ears, nose, and mouth (*blue* lines) onto both sides of the blank. Connect the end of each line on one side to the corresponding one on the other side, visually dividing the blank into a series of blocks.

The shaded blocks on the patterns show where wood will be removed when you rough out the carving. For more graphic guidance, draw depth lines on your carving blank to indicate how much material you need to remove in these areas.

On the top and bottom in the body, neck, and face areas, draw the depth lines 3/16" in from and parallel to each side of the blank.

Continued

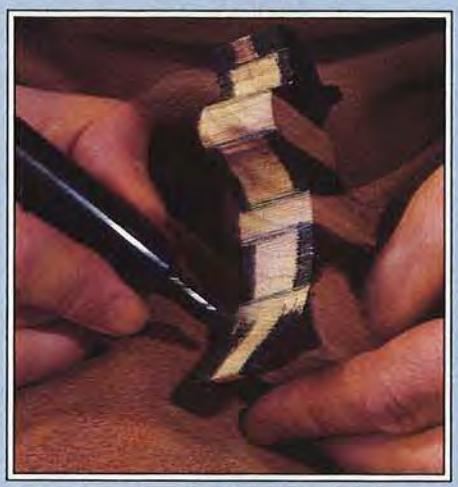




HOUN' DAWGS

For the tail, nose, and tongue, draw the depth lines 5/16" from each side. Divide the front and hind legs into equal widths with about 3/16" between them.

For even better visualization, color the tail, body, neck, and face blocks on the side of the blank with a marker. Then, color the portion between the side of the blank and the depth line for each part, as shown *below*.



Coloring the waste areas on the blank with a marker assists in visualizing the roughed-out dog.

Stop-cut the pattern lines and depth lines before paring away the waste wood. Carve only as deep as your stop cuts or they won't do any good.

STEP 3 Make your stop cuts.

To carve a pattern, you must be able to cut right up to a line without chipping out the wood beyond the line. Incisions along the pattern line, called *stop cuts*, will accomplish that.

With the knife blade perpendicular to the blank, cut along each pattern line and depth line to stop-cut your hound. Cut on the waste side of the line, about 1/8" deep, shown *above right*.

Stop-cutting comes with a catch, though. It only works if your stop-cuts are as deep as the cut you're making. In other words, if you stop-cut 1/8" deep and then dig your knife in to carve out a 3/16" chip, your stop cut will do no good. You'll watch in dismay as the wood tears out far beyond the pattern line, ripping right past the stop-cut you thought would save you.

And don't try to jam the knife in far enough to reach full depth in one cut. You'll be most successful if you stop-cut, carve a little, and then stop-cut again.

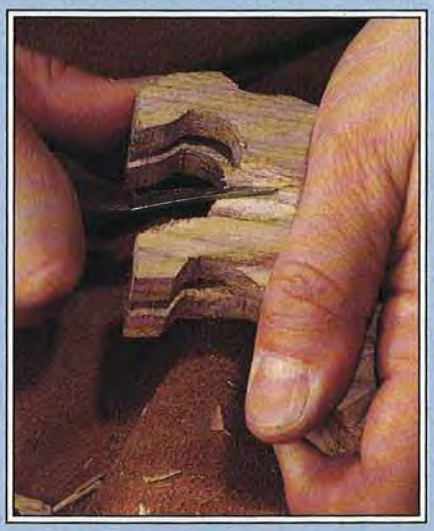
By working in shallow stages, you'll minimize the chances of going astray. And if you do, the damage will be easier to repair or work around.

STEP 4 Rough out your dog.

With the prelims over, you now can cut away wood to shape that blank into Bowser. Start by establishing basic proportions and shapes, a process known as *roughing out* the carving.

First, carve the shaded wood away from the body, neck, and face. Next, separate the legs. For easier wood removal, drill a few 3/16" holes between them.

Alternately stop-cut and pare away waste wood to bring the carving down to a series of flat-sided blocks, shown *below*. Don't worry about rounding edges or developing curves yet.



Carve flat surfaces as you rough out the dog. Later, you'll round the body and add the details.

Keep your knife sharp to make clean cuts, especially across end grain. A dull knife will spoil your carving enjoyment. And it can be dangerous, too; pushing a dull knife through wood requires more force, which can cause you to lose control.

You can take moderately deep cuts while roughing out, but remember not to go deeper than your stop cuts if you're working toward a line. Control cutting depth by laying the bevel of the knife blade on the wood, and then raising the back of the blade just enough to pare off a shaving.

In some spots you can use a pencil-sharpening (or carrot-peeling, if you prefer) motion to cut away a lot of wood quickly. For the best control and results, carve with the grain whenever possible.

Rough out the nose, tongue, and tail last. When carving the tongue, redraw the blue line for the mouth, and carefully carve to it with the tip of your knife, as shown *above*.

STEP 5

Now, make it *your* dawg.

Hot dog! Now your carving looks decidedly like a dog. It's a blocky, rude one, but recognizable nonetheless. From this point, it's up to you to give your carving the personality that will turn it into a *dawg*.

Taking small cuts, round the corners of the body, legs, face, and nose. Curve the sides slightly to form oval cross sections. (Leave the tongue and tail until last—they're less likely to break off that way.) Smooth the surfaces, blending them together, as *below*.

Fair the ears into the top of the head, letting them hang below the neck. Make the ears about 1/16–1/8" thick at the bottom.

Taper the face and muzzle toward the nose, adding a series of notches on the muzzle to represent wrinkles. Experiment with nose shapes to give your dawg its own personality.

For the eyes, inscribe a tall arc on each side of the face. Drill a small hole near the center bottom by rotating the tip of your knife, as shown *below*.

Rotate the tip of the knife in the wood to drill a small hole for the eye.

Finish up with the tongue and tail. Sand with 150-grit sandpaper to remove fuzz and slivers. Finish as desired. (We applied Danish oil to our dawgs.)

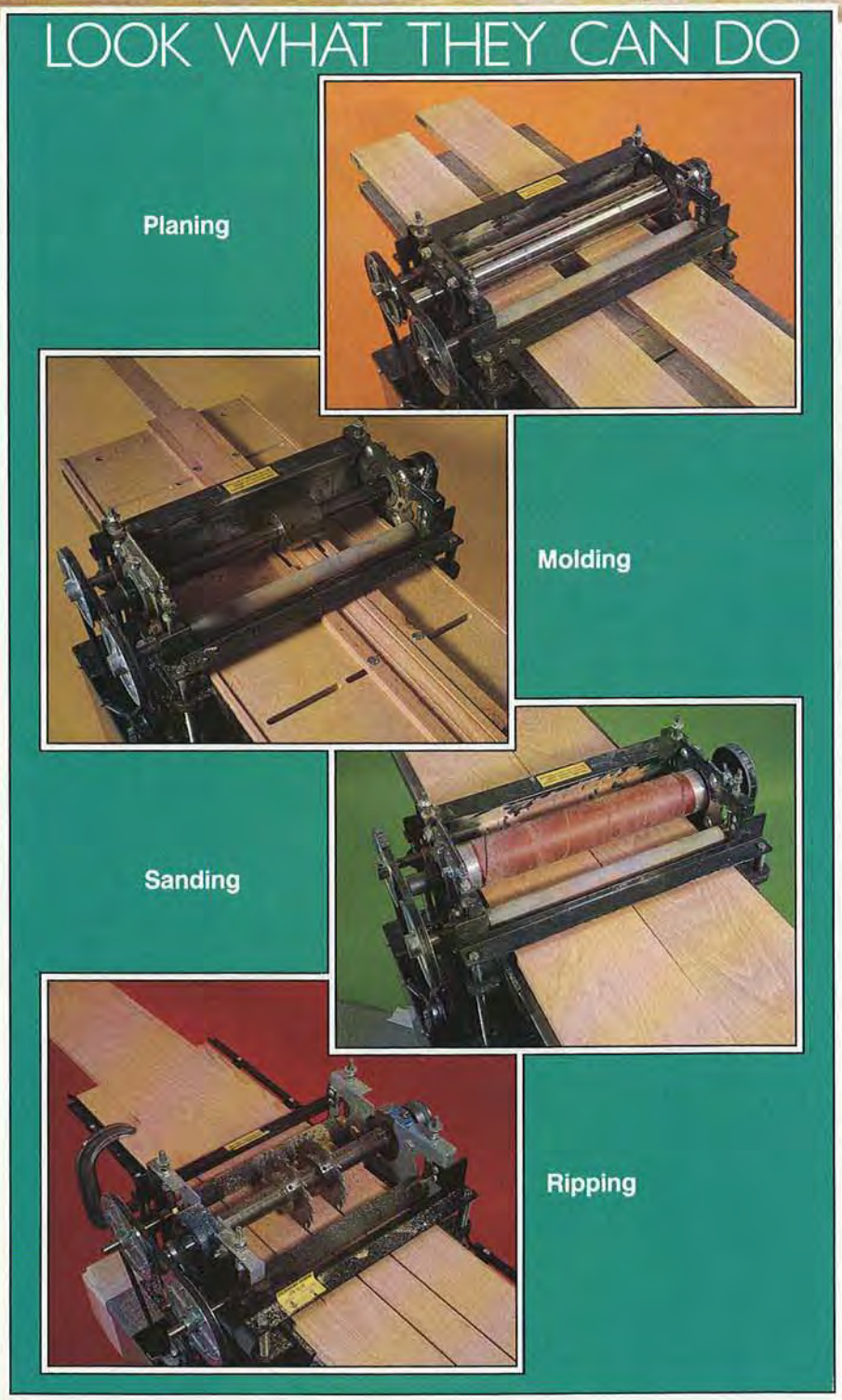
Project Design: ©Bill Loftis
Written by Larry Johnston
Illustrations: Mike Henry
Photographs: John Hetherington; Wm. Hopkins

Take light cuts when surfacing the carving. Shave the surface smooth, but let some knife marks remain as a sign of hand-carving, if you prefer.

Multipurpose PLANER/MOLDERS

Print this article

LOOK WHAT THEY CAN DO



Looking to improve your shop's productivity without eating up a lot of work space? Perhaps one of the multipurpose planer/molders featured here can help.

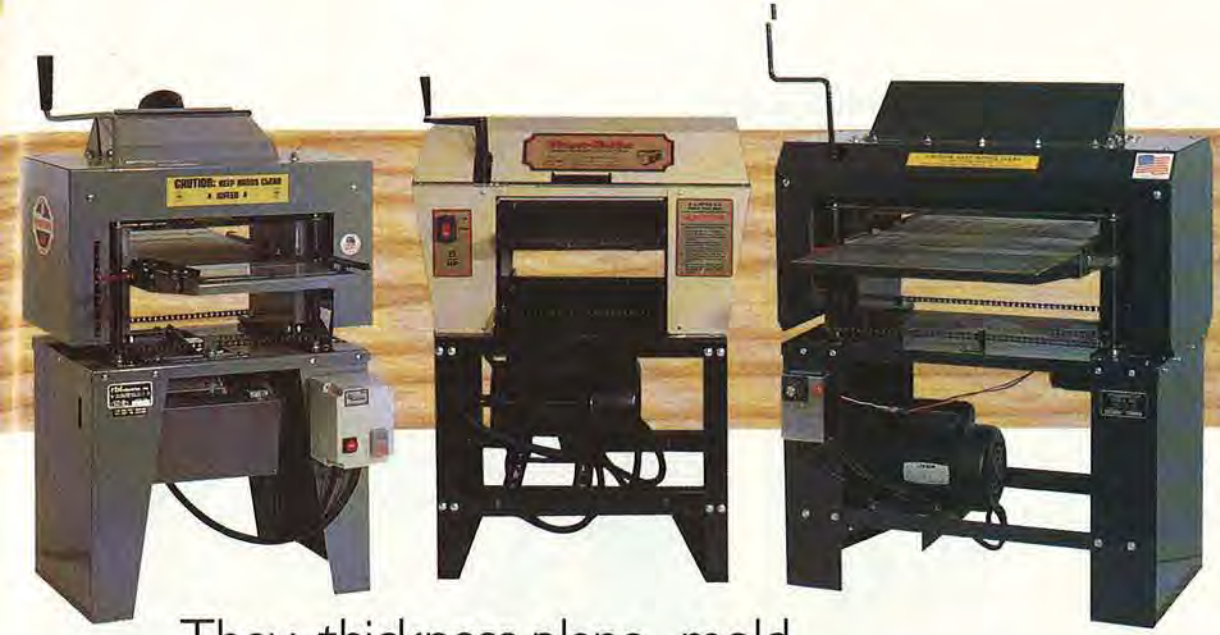
How planer/molders work

These versatile machines enable you to transform rough lumber into finished stock—quickly and conveniently. You can plane lumber to a desired thickness with any of them. And, by switching to the drum-sanding operation, you can sand the stock silky smooth. *(The drum sanders work well for removing planer marks and other light sanding, but these machines are not designed for thickness sanding or other tasks that require heavy stock removal.)*

Depending on the model you buy, you also can slip several 5½" or 6½" saw blades onto an accessory shaft and gang-rip stock up to 1¼" thick. (Gang-ripping means cutting two or more pieces of stock to width in one pass.)

Note: *Of the three brands tested—Belsaw, RBI, and Woodmaster—only the Belsaw model does not rip stock, because it has a fixed cutterhead. The other machines have interchangeable cutterheads that you replace with an accessory shaft that holds saw blades or molding knives.*

And finally, you can mold stock to any desired profile. With their standard-equipment 5-hp, 220-volt motors, all of these machines will cut up to five ¾"-thick moldings in one pass. All three manu-



Left: **RBI 612 (with optional dust-collection attachment)**

Center: **Belsaw 985-5**

Right: **Woodmaster 718 (with optional dust-collection attachment)**

They thickness-plane, mold, sand, and some even saw

facturers will custom-grind knives to your design if you can't find a suitable profile in their stock of molding knives.

We tested the following machines

You can buy planer/molders in several sizes and in an array of packages tailored for specific uses. Although the machines differ from manufacturer to manufacturer, each brand of machine has nearly identical models that vary only in the width of their cutterheads and beds. For this article, we asked each maker to send us its most popular model and all of its accessories. RBI delivered us the model 612 with a 12"-wide cutterhead. (RBI also carries a lighter-duty 12" machine and a heavy-duty 20" version.) Woodmaster shipped the 18" model 718 (you also can buy similar 12" and 25" units). Belsaw supplied its only planer/molder, the 12" model 985-5.

In the chart on *page 66*, we list the prices of each machine in up to five option packages, just to give you an idea of accessory combinations and approximate costs. Keep in mind that you can custom-order a planer/molder to suit your needs, so be sure to discuss your requirements with the manufacturer before ordering.

The advantages of owning a multipurpose planer/molder

No other single machine or combination of machines will perform as many tasks for the same initial investment as a planer/molder. (Most models cost less than $2,000.) If you were to buy a thickness planer, shaper, and drum sander of equal power and capacity, the cost could easily be two to three times higher. To most woodworkers, this savings more than makes up for the time it takes to change from one function to another. (We cover this topic in depth later.)

And, the savings don't stop there. You can buy molding knives for these machines at a fraction of the cost of shaper cutters. Most molding knives, for instance, cost $30–$60 each. That compares with an investment of at least $100–$200 for shaper cutters that create the same or similar profile. Even large planer/molder knives such as those used for antique baseboards cost under $100 per knife. And, standard molding heads require just one knife. Custom-ground knives cost about $15–$30 per inch.

Of course, these machines do not completely take the place of shapers. For instance, planer/molders will not make end-grain cuts, and they won't cut odd-shaped workpieces such as arch-shaped raised panels.

But, if you just want to make moldings, you won't find a faster or safer machine in this price range. Because of a power-feed roller system, you can place several molding heads in the unit and cut moldings at rates up to 32 feet per minute. (Manufacturers recommend speeds of 11–12 fpm for best results with most hardwood stock.) And with power feeding, your hands never get near the knives during operation.

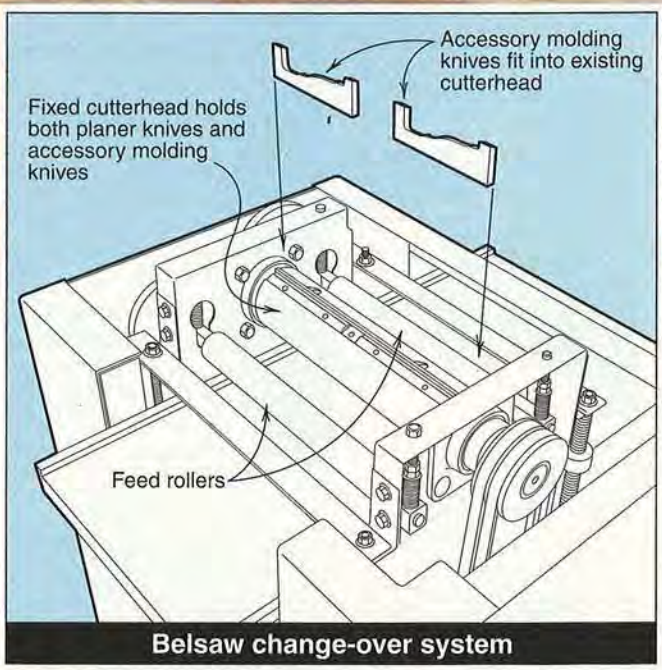
You also can maintain any of the models easily and affordably. Most of their parts, from nuts, bolts, and washers to belts, bearings, and motors, are off-the-shelf items available from hardware stores or industrial-supply houses. All three manufacturers also stock spare parts.

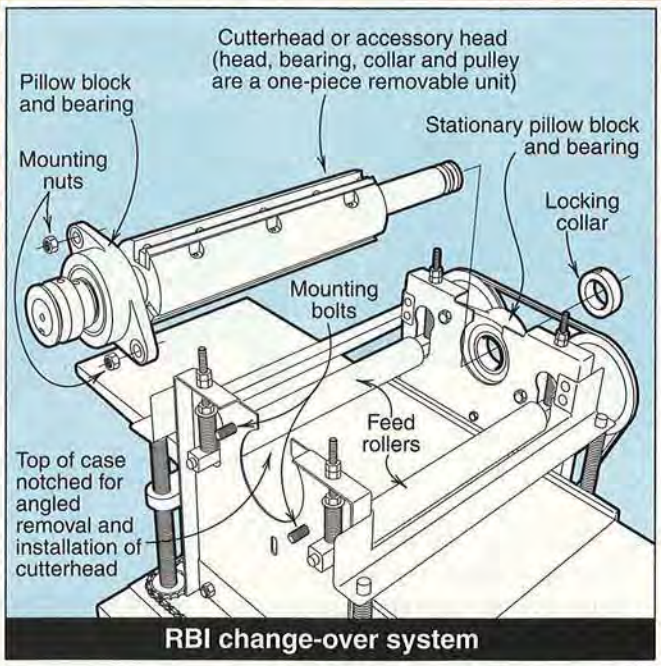
All in the family: a look at the three manufacturers

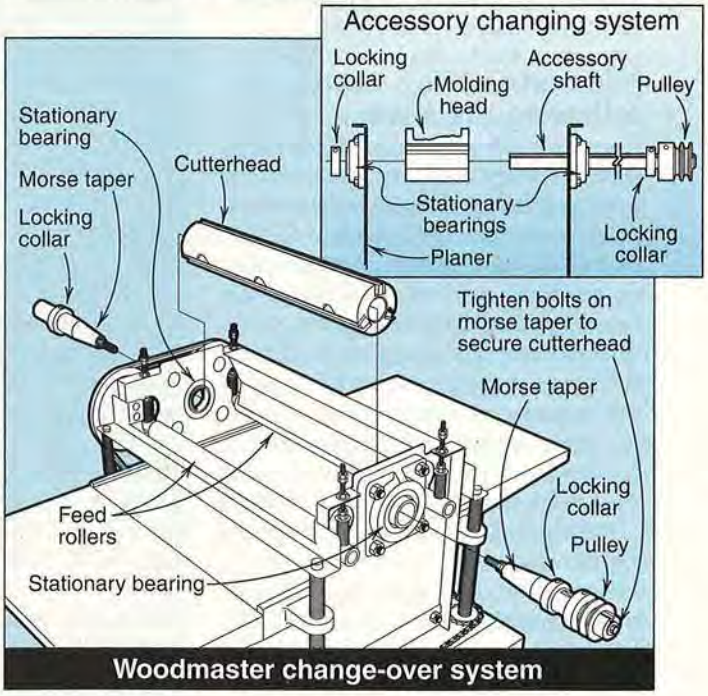
Although different in many respects, all of these machines look similar at first glance, and even share many of the same parts. And that's no accident.

Today's multi-purpose planer/molders descended from the original Belsaw planer/molder produced in Kansas City, Mo., more than 50 years ago. This machine still had the market all to it-

Continued


Accessory molding knives fit into existing cutterhead
Fixed cutterhead holds both planer knives and accessory molding knives
Feed rollers
Belsaw change-over system


Cutterhead or accessory head (head, bearing, collar and pulley are a one-piece removable unit)
Pillow block and bearing
Stationary pillow block and bearing
Mounting nuts
Locking collar
Mounting bolts
Feed rollers
Top of case notched for angled removal and installation of cutterhead
RBI change-over system



Woodmaster change-over system

self in 1977 when Belsaw merged with Foley to form Foley-Belsaw. Then, production of the machine was moved from RBI (which manufactured the machine for Belsaw exclusively) to a former Foley plant in Minneapolis where Belsaw machines are still made today. (Belsaw and Foley have since parted ways.)

In 1980, Foley-Belsaw employee John Miller broke away from that company to form Woodmaster, and contracted with RBI to do the manufacturing. Then in 1985, RBI began producing and selling its own versions of the machine, and Miller shifted the production of his planer/molders to Progressive Manufacturing of Kansas City.

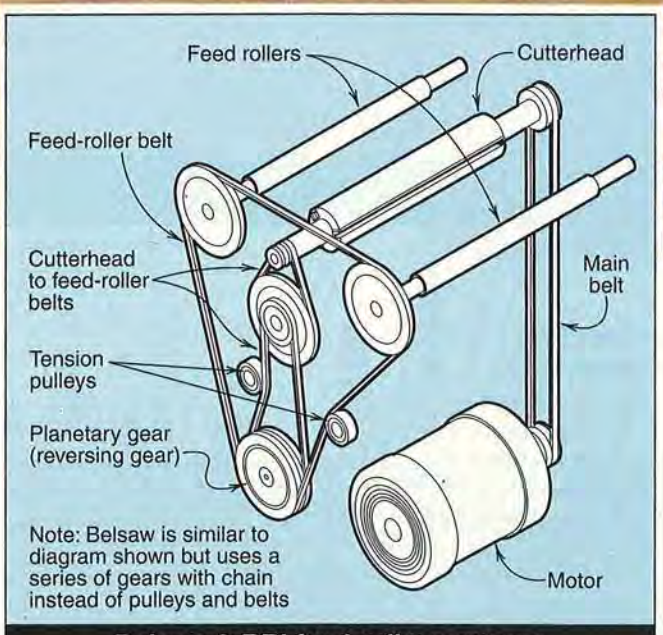
Change-over systems: how they differ

We discovered the biggest difference between the three brands of machines when we changed them from one function, such as planing, to another job, such as molding, sanding, or ripping. Here's a look at each system.

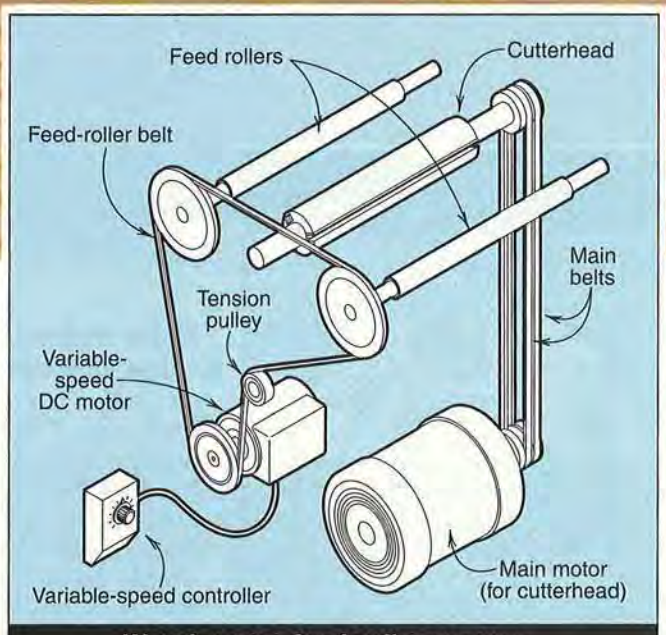
The Belsaw 985-5, shown *above left*, has the most basic setup for changing functions. The cutterhead remains fixed, so you need to remove the planer knives to change to molding or sanding. The molding knives fit into one of the three knife-holding grooves in the cutterhead (you need to place counterweights in the other two grooves). To drum-sand, you secure three pieces of sandpaper to the cutterhead surfaces between the grooves. Aluminum gibs hold the abrasive sheets in the cutterhead grooves.

The RBI 612 and 820 models have the system shown *top right*. Here, you leave the planer knives in place and remove the cutterhead entirely. You put either a drum-sanding head or accessory shaft in its place. (The accessory shaft accommodates rip-saw blades or molding-knife holders.) Both of these have a pulley, and a pillow block containing a bearing, attached to them. You then replace the mounting nuts and hook up the belts.

The Woodmaster models use the system shown *above*. Here, 1½" Morse-taper shafts hold the cutterhead in place. To switch to another function, you remove the cutterhead and replace it with an accessory shaft that holds a sand-


Feed rollers
Cutterhead
Feed-roller belt
Cutterhead to feed-roller belts
Main belt
Tension pulleys
Planetary gear (reversing gear)
Note: Belsaw is similar to diagram shown but uses a series of gears with chain instead of pulleys and belts
Motor

Belsaw & RBI feed-roller systems



Woodmaster feed-roller system

ing drum, molding-knife holders, or rip-saw blades (see the inset illustration *left* for an idea of how these components go together).

Keep in mind that with the RBI and Woodmaster machines, you do not have to buy the accessory shafts and molding-knife holders to do molding. You could place molding knives into the cutterhead as you must do with the Belsaw unit. Although this procedure saves you money, it takes considerably longer because you must reset all of the planer knives before you plane again. If you can afford the accessory shafts, we strongly recommend you go this route. You'll quickly make up the extra cost in time savings.

In our tests, the Belsaw unit took us 25–30 minutes to change from planing to molding. Replacing the knives in the cutterhead took us another 10 minutes.

You'll save a good deal of time in changeovers with the RBI and Woodmaster units if you buy the accessory shafts. Because you leave the planer knives in the cutterhead, these machines only require 10–15 minutes for each change. The RBI system holds a slight edge over the Woodmaster in terms of convenience, saving you maybe a minute or so between changeovers. But, the RBI cutterheads, sanding drum, and accessory shaft cost more because each one has its own bearing and pillow block.

Feed-roller systems: points to keep in mind

All three brands of planer/molders employ a different type of feed-roller system—the mechanism that moves wood through the machine during an operation. As shown *above left*, the main motors on the Belsaw and RBI machines power the cutterhead *and* the feed rollers. The machines do differ in that RBI has a pulley-and-belt system for the feed rollers whereas the Belsaw has sprockets and chains.

With both of these systems, the rotation speed of the feed rollers maintains pace with the cutterhead. If the cutterhead slows down because of a deep cut, the rate of feed will slow down also. This maintains a consistent number of cuts per inch.

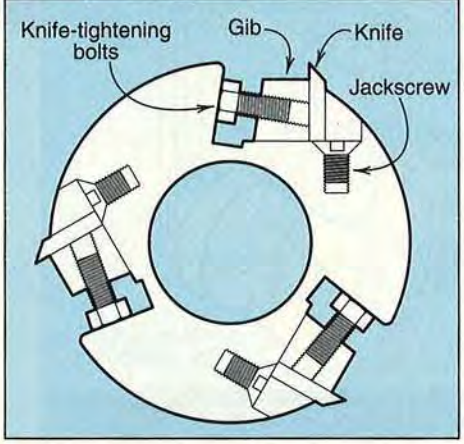
Both the Belsaw and RBI 612 and 820 units have two speeds. The Belsaw comes set up to run at a feed rate of 12 feet per minute, and the RBI machines run at 11 feet per minute for most applications. You can change the speed of the Belsaw to 20 feet per minute by purchasing and installing a special sprocket. This requires some effort, but the RBI changes speeds quite easily. All you need do is reconfigure the belts that power the feed rollers.

Woodmaster takes an altogether different approach. As shown *above right*, Woodmaster's feed rollers operate independently of the cutterhead because they're powered by a variable-speed DC motor. This means all of the main motor's power goes into the cutting action, and you can slow the feed rate down to a crawl if necessary. The DC motor will continue to feed the stock in the event the cutterhead bogs down, but this won't happen if you operate the machine properly.

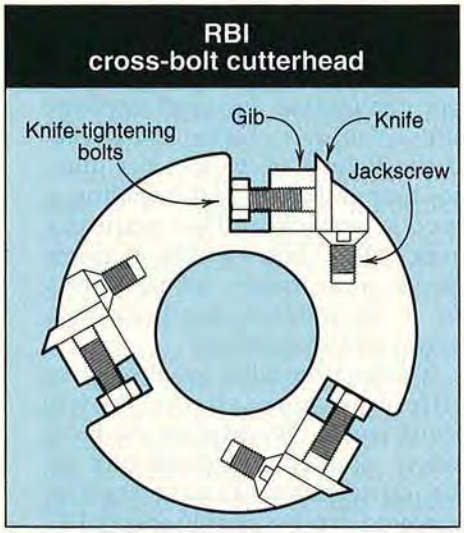
Although we didn't need the variable-speed feature for about 90 percent of our test work, it does come in handy at times. By slowing down the speed, you can get especially smooth cuts without any grain tear-out in highly figured woods.

Continued

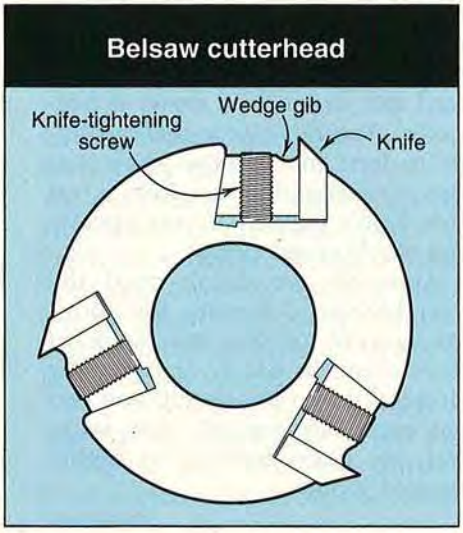
Woodmaster cross-bolt cutterhead



RBI cross-bolt cutterhead



Belsaw cutterhead



Knife-locking mechanisms: some differences here, too

As shown in the drawings *left,* both the RBI and Woodmaster machines have cross-bolt systems for locking the knives into the cutterhead. To adjust the three planer knives into alignment, you simply raise or lower them with the jackscrews, and then tighten them into place with the knife-tightening bolts. We found that these systems make the tedious chore of precisely setting knives as easy as possible.

With the Belsaw system, however, you tighten setscrews that raise the gibs and wedge the planer knives into position. As you tighten the screws, the knives tend to climb up also. You then tap the knives with a block of wood and a mallet before final tightening. We found it difficult to fight this climbing effect.

The molding-knife holders on the RBI and Woodmaster machines use wedge gibs similar to those in the Belsaw cutterhead. But, since each holder has only

MANUFACTURER/ IMPORTER	MODEL	TYPE (1)	MOTOR				
			VOLTS	HORSEPOWER	AMPS	SWITCH TYPE (2)	
BELSAW	985-5	TEFC	220	5	23.5	M	
RBI	812	TEFC	220	2	10	P	
	612	TEFC	220	5 (11)	26	M	
	820	TEFC	220	5	26	M	
WOODMASTER	712	TEFC	220	5	23	R	
	718	TEFC	220	5	23	R	
	725	TEFC	220	5	23	R	

NOTES:

1. (TEFC) Totally enclosed, fan cooled
2. (M) Magnetic safety switch (P) Standard pushbutton switch
   (R) Standard rotary switch
3. (a) accessory shaft
   (c) casters
   (cb) cutterbits
   (ch) cutter-bit holders
   (ck) custom-molding knives
   (cs) cutterhead stands
   (d) dust-collection attachment
   (ds) drum-sanding kit
   (e) edge-molding guides
   (et) extension tables
   (i) instructional video tapes
   (k) knife-setting gauge
   (m) molding head
   (mg) molding guide system
   (n) RBIdeas newsletter
   (p) preventative-maintenance kit
   (pk) planer knives
   (r) rip-saw kit
   (s) 20-fpm feed sprocket
   (sk) stock molding knives
   (w) bed wax

A COMPARISON OF MULTIPURPOSE PLANER/MOLDERS

BED SIZE (INCHES)							ACCESSORIES (3)			WARRANTY (YEARS)	PRICE (4)				
WIDTH	LENGTH	LENGTH WITH EXTENSION TABLES	FEED RATE (FEET PER MINUTE)	CUTS PER INCH	MAXIMUM THICKNESS OF WORKPIECES (INCHES)	NUMBER OF PLANER KNIVES	STANDARD	OPTIONAL	MOTOR	MACHINE	PLANER ONLY	PLANER-MOLDER (5)	PLANER-MOLDER-SANDER (6)	PLANER-MOLDER-SAW (7)	PLANER-MOLDER-SANDER-SAW (8)
12 3/8	27 1/4	NOT AVAILABLE	12 or 20 (9)	94 or 56 (9)	6 1/4	3	pk	c, ck, d, ds, e, i, k, mg, p, s, sk, w	1	1 (10)	$1,399.00	$1,469.00	$1,488.50	NOT AVAILABLE	NOT AVAILABLE
12 1/8	16 1/2	34 1/2	11	88	8	2	a, cb, ch, et, m, mg, n, pk	ck, cs, d, k, sk	1	3	NOT AVAILABLE	799.00	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE
12 1/4	18 1/4	42	11 or 32 (12)	94 or 32 (12)	6 1/2	3	et, k, n, pk	ck, cs, ds, m, mg, r sk	1	3	1,299.00	1,497.00	1,746.00	1,587.00	1,915.00
20 1/2	19 1/4	44 1/4	11 or 32 (12)	93 or 31 (12)	8	3			1	3	1,749.00	1,983.00	2,282.00	2,073.00	2,467.00
12 1/4	18 3/8	42 9/16	0 to 16	0 to 1,000	6 3/4	3	et, k, pk	a, c, cb, ch, ck, d, ds, i, m, mg, r, sk	1	3	1,299.00	1,410.00	1,509.00	1,500.00	1,599.00
18 1/2	18 1/2	42 9/16	0 to 16	0 to 1,000	6 3/4	3			1	3	1,699.00	1,740.00	1,909.00	1,830.00	1,999.00
25	25	49	0 to 16	0 to 1,000	6 3/4	3			1	3	2,399.00	2,710.00	2,909.00	2,800.00	2,999.00

4. Prices do not include shipping costs. Prices current at time of article's production.
5. All of the machines come with cutterheads that hold molding knives. Prices in this column include optional accessory shaft, one molding-knife holder, and adjustable bed board. The Belsaw 985-5, and RBI 812 do not accept accessory shafts and molding-knife holders, so with these machines you must mount molding knives into the same cutterhead that holds the planer knives.
6. These packages include one accessory shaft, one molding-knife holder, one adjustable bed board and drum-sanding assembly. The Belsaw 985-5 does not include accessory shaft or molding-knife holder (see note 5).
7. These packages include one accessory shaft, one molding-knife holder, one adjustable bed board, and one gang-saw blade with hub.
8. These packages include all of the items listed in note 7 plus the drum-sanding accessory.
9. Belsaw machine comes set-up for feed rate of 12 feet per minute (94 cuts per inch). To change to faster feed rate you must purchase and install 20-fpm feed sprocket ($14.95).
10. Extended warranty available.
11. RBI model 612 available with 3-hp motor for $150 less.
12. RBI models 612 and 820 come set up for feed rate of 11 feet per minute (94 cuts per inch). To change to faster feed rate you must reconfigure the drive belts.

one knife, you don't have the alignment problem that you do with the three-knife cutterheads.

Woodmaster recently came out with an improvement to its molding knives and gibs. As you can see *left,* RBI and Woodmaster molding-knife holders appear identical, but the Woodmaster knife and gib have corrugated ridges milled into them. In our tests, this system helped the knife remain parallel to the molding head as we tightened the screws in the gib. This system eliminates the possibility (albeit a remote one) of the knives flying out of the knife holder during operation. RBI officials plan to introduce a corrugated knife/gib system in the near future.

***Left:* RBI and Woodmaster have identical molding-knife holders except that Woodmaster's knives and gibs *(right side of the photo)* feature milled corrugations for holding the knife.**

What you should know about planer/molder motors

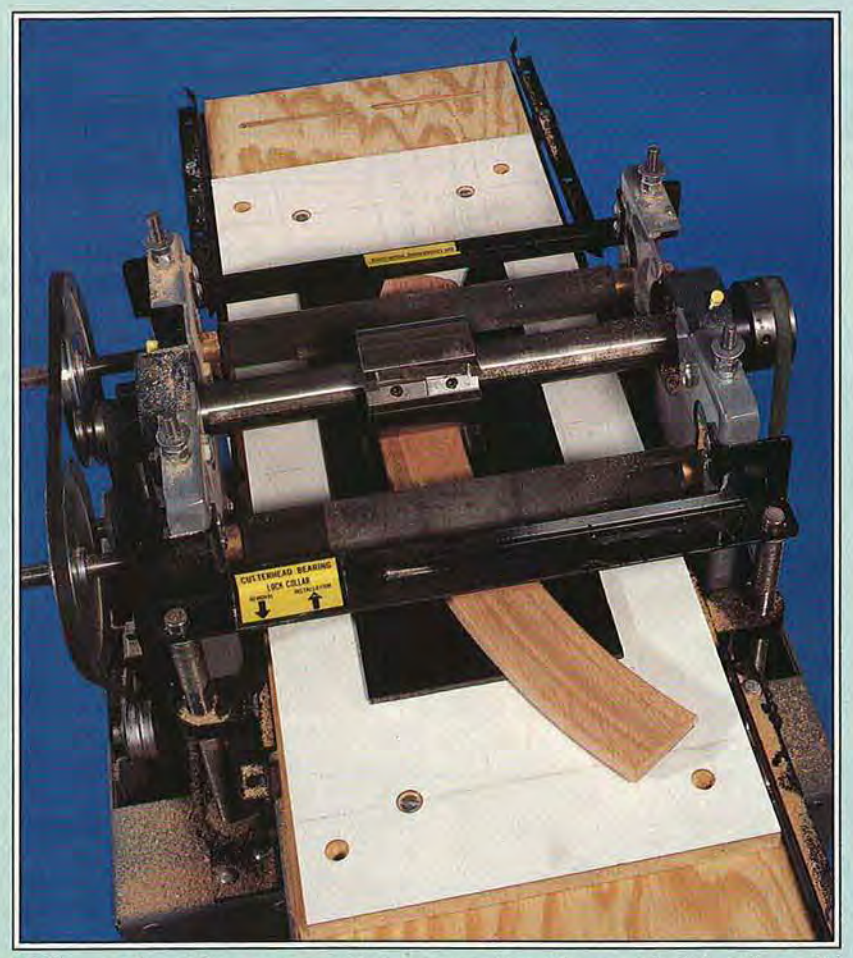
All of the machines we tested came with 5-hp motors, but the RBI motor was larger and capable of sustaining a continuous 5-hp load for a longer period of time than the motors on the other two models. RBI officials told us that many of their customers request this motor because they use the molder/planer for long periods of time in commercial-production situations. Woodmaster also will supply a similar motor for an additional fee, if a customer requests it. In our tests, all of the motors seemed sufficiently powerful. All featured totally-enclosed, fan-cooled construction.

Continued

SOME NIFTY ACCESSORIES

For any of these machines, we consider the optional dust-collection attachments to be must-have accessories. These machines produce large volumes of sawdust and chips no matter what operation you put them through. We hooked all of the machines up to a 3-hp dust collector and all of the dust-collection attachments worked well. When drum-sanding, you absolutely must have dust collection for the machine to operate properly. Without it, the drum will quickly load up with debris, rendering it useless.

If you want to make curved moldings, you should know about a new accessory from RBI. Its curved-molding fixture (shown *right*), consists of a guide board and curved templates that you screw to the bottom of a workpiece. Three different guide boards and templates help you make curved moldings with 15", 18", or 24" radii. The accessory sells for $129.



RBI's curved-molding accessory helps you cut moldings with 15", 18", or 24" radii. Templates screwed to the bottom of the molding guide it along.

Recommendations

We found the RBI and Woodmaster to be closely matched machines, with the Belsaw lagging behind. Since getting into the molder/planer business, RBI and Woodmaster have substantially improved on the basic molder/planer design by adding quick-change accessories and gang-ripping capability. Meanwhile, the Belsaw machine has changed little over the years.

Our advice: Closely examine the points made in this article, and then determine how big of a machine you need, and what accessories best fit your work requirements. Then, call each manufacturer, explain your needs, and ask for a quote on a machine tailored to your requirements. Consider which manufacturer spends the most time with you and offers the best advice.

Manufacturers Listing:

Belsaw
4111 Central Avenue N.E.
Minneapolis, MN 55421
800/468-4449
612/781-0575

RBI
1801 Vine St., P.O. Box 369
Harrisonville, MO 64701
800/487-2623
816/884-3534

Woodmaster
1431 N. Topping
Kansas City, MO 64120
800/821-6651
816/483-0078

Written by Bill Krier Technical consultant: George Granseth Illustrations: Kim Downing Photographs: John Hetherington

CRAFTSMAN-STYLE WALL LANTERN

TURN-OF-THE CENTURY LOOKS STILL FRESH TODAY

Want to replace your dated exterior lights with something more stylish? Now, with this pleasing outdoor light, you can. We accented our design with stained glass, a decorative grille, and a large overhanging roof. To install, consider post-mounting your light as shown here, or attach it to your house adjacent to an exterior door. Build several and use them to brighten up your deck or patio.

Start with the lantern frames

Note: *To enable your light(s) to stand up to the elements, adhere the pieces using Titebond II water-resistant glue or slow-set epoxy.*

1 From ¾" Honduras (genuine) mahogany (not Philippine mahogany, which is not a true mahogany, and is not as durable), cut the frame stiles (A), bottom rails (B), and top rails (C) to the sizes listed in the Bill of Materials.

2 Glue and clamp each of the four frames together in the configuration shown on Step 1 of the Frame Assembly drawing.

3 To strengthen the weak butt joints, use a doweling jig and drill a ⅜" hole 1½" deep at each joint where shown on Step 1 of the Frame Assembly drawing and as shown in photo A.

4 Cut sixteen ⅜" dowels to 1¾" long. Glue a dowel in each hole. Later, trim the protruding dowels flush with the outside edges of each frame. Sand both surfaces of each frame.

5 Fit your table-mounted router with a rabbeting bit, and rout a ¼" rabbet ⅜" deep along the back inside edge of each frame. Chisel the round-routed corners square.

6 Tilt your tablesaw blade to 45°, and bevel-rip both edges of each frame as shown in Step 2 of the Frame Assembly drawing.

Continued

LANTERN

7 To glue the frames together, lay the frames bevel side down on your workbench. Apply masking tape along the three mating edges where shown in Step 3 of the drawing. Carefully flip the assembly over, and apply glue to the mating beveled edges.

8 Stand the assembly upright, and apply tape along the remaining corner. As shown in photo B, use a pair of band clamps to clamp the four frames together. Not only does the masking tape help hold the pieces in place while you apply the band clamps, it also prevents glue from squeezing out onto the outside of the frames.

9 For attaching to the roof assembly later, drill and countersink a mounting hole in two opposite top rails where shown on the Exploded View drawing.

Now, let's add the decorative grilles

1 Resaw or plane thicker stock to ¼" thick, and then rip three ¼×¼×40" pieces for grille parts. Crosscut eight upright grille parts (D) and four crossbars (E) from the 40"-long strips.

2 Fit your tablesaw with a ¼" dado blade, and cut dadoes in the grille parts where dimensioned on the Exploded View drawing. (We screwed a wooden auxiliary fence to our miter gauge. Then, we clamped a stopblock to the auxiliary fence to ensure consistency in the positioning of the dadoes from piece to piece.)

3 Glue the four grille assemblies together, checking for square.

Top your lantern with a stylish roof

1 Using the dimensions on the Roof Supports drawing for reference, cut the roof-support blanks (F) to 1 7/16×15". Mark the location of the tapers and mating-notches. Cut the dadoes, and then bandsaw the tapers. Glue the two parts together.

2 Using the dimensions on the Parts View drawing, lay out the roof-piece (G) outline onto a

Using a doweling jig for alignment, drill a ⅜" dowel hole at each butt joint.

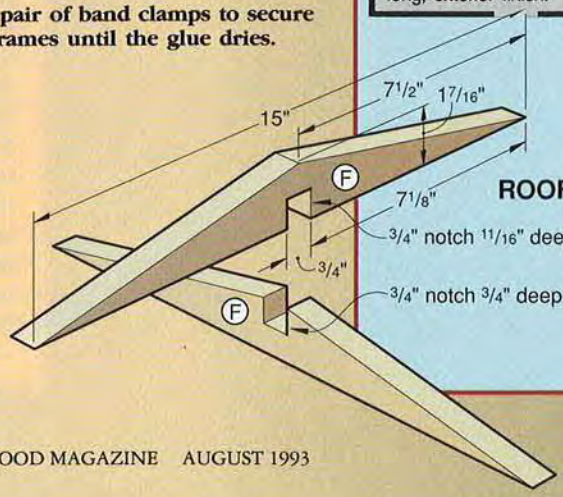
Tighten a pair of band clamps to secure the four frames until the glue dries.

Bill of Materials

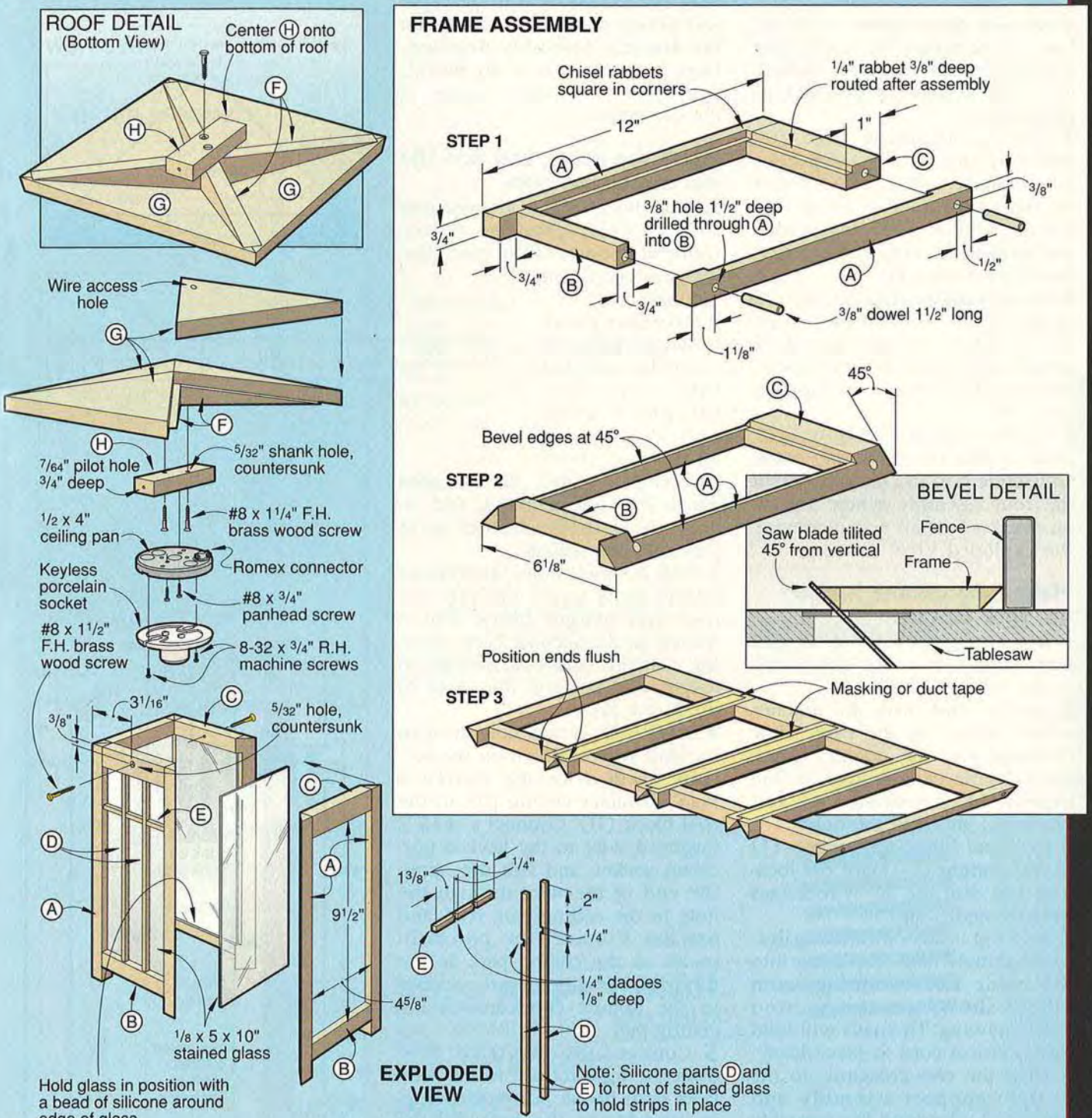
Part	Finished Size T	W	L	Matl.	Qty.
FRAMES					
A stiles	¾"	¾"	12"	M	8
B bottom rails	¾"	¾"	4⅝"	M	4
C top rails	¾"	1"	4⅝"	M	4
GRILLES					
D uprights	¼"	¼"	9½"	M	8
E crossbars	¼"	¼"	4⅝"	M	4
ROOF					
F supports	¾"	1 7/16"	15"	M	2
G roof	¾"	6¼"	12"	M	4
H block	¾"	1½"	4⅝"	M	1
HANGER					
I upright	¾"	2¼"	17⅜"	M	1
J support	¾"	1"	14⅜"	M	1
K crossbars	¾"	1"	11"	M	2
L block	¾"	¾"	2"	M	1
POST (optional)					
M sides	¾"	3½"	10'	M	2
N sides	¾"	2"	10'	M	2
O cap	¾"	3½"	3½"	M	1

Material Key: M–Honduras mahogany

Supplies: ¼" dowel stock, ⅜" dowel stock, two galvanized shingle nails with the heads cut off, #10 brass screw eyes, #8×1¼" flathead brass wood screws, #8×1½" flathead brass wood screws, #10×1½" flathead brass wood screws, #10×2½" flathead brass wood screws, #10 brass finish (countersunk) washer, #8×¾" panhead screws, ½x4"-diameter ceiling pan, Romex connector, silicone sealant, four stained-glass panels, keyless porcelain socket, #16/2 neoprene insulated wire, #3 straight-link brass-plated machine chain 3" long, exterior finish.



ROOF SUPPORTS


ROOF DETAIL
(Bottom View)
Center (H) onto bottom of roof
F
H
G
G
Wire access hole
G
F
H
7/64" pilot hole 3/4" deep
5/32" shank hole, countersunk
1/2 x 4" ceiling pan
#8 x 1 1/4" F.H. brass wood screw
Romex connector
Keyless porcelain socket
#8 x 3/4" panhead screw
#8 x 1 1/2" F.H. brass wood screw
8-32 x 3/4" R.H. machine screws
3/8"
3 1/16"
C
5/32" hole, countersunk
E
D
A
B
1/8 x 5 x 10" stained glass
Hold glass in position with a bead of silicone around edge of glass
C
A
9 1/2"
4 5/8"
B
FRAME ASSEMBLY
STEP 1
Chisel rabbets square in corners
1/4" rabbet 3/8" deep routed after assembly
12"
1"
A
C
3/8"
3/4"
3/8" hole 1 1/2" deep drilled through (A) into (B)
3/4"
B
3/4"
A
1/2"
3/8" dowel 1 1/2" long
1 1/8"
STEP 2
45°
C
Bevel edges at 45°
A
B
6 1/8"
BEVEL DETAIL
Saw blade tilited 45° from vertical
Fence
Frame
Tablesaw
STEP 3
Position ends flush
Masking or duct tape
1 3/8"
1/4"
2"
1/4"
E
1/4" dadoes 1/8" deep
D
EXPLODED VIEW
Note: Silicone parts (D) and (E) to front of stained glass to hold strips in place
CUTTING DIAGRAM
D C D I C J D F K H B
G G G G
E A E A A L
3/4 x 7 1/4 x 96" Genuine Mahogany

LANTERN

piece of hardboard or ¼" plywood. Cut the template to shape. Use the template to mark four roof-piece outlines on the mahogany stock as laid out on the Cutting Diagram.

3 Tilt your bandsaw table 10°, and cut the four roof pieces where shown. Test-fit the pieces on top of the roof supports (F). Tilt the table on your disc sander, and sand the mating edges if necessary for a tight fit.

4 Using masking tape as we did earlier with the lantern frames, glue and tape the roof pieces together. Later, glue the roof assembly (four Gs) to the roof supports (two Fs).

5 Cut the roof block (H) to size. Drill a pair of mounting holes, and screw it to the bottom side of the roof assembly where shown on the Roof detail accompanying the Exploded View drawing.

Make a handsome hanger for your lantern

1 Rip and crosscut the hanger parts (I, J, K, L) to the sizes listed in the Bill of Materials.

2 Lay out and mark the notches where shown on the Parts View drawing. Cut the notches. Mark the ¼" hole centerpoints on the support (J), crossbars (K) and block (L) and drill the holes.

3 Glue and screw the support (J) to the upright (I). Mark the location and drill the ⅜" wire access hole through J and I.

4 Snip the heads off of two galvanized shingle nails. Tap them into the inside face of one crossarm where shown on the Section View drawing. The nails will hold the electrical cord in place later.

5 Glue the two crossarms to the upright/support assembly and block (L), checking the assembly for square and squeezing the headless galvanized nails between the two pieces.

6 Using the previously drilled holes in the crossarms as guides, drill ¼" holes through the support, upright, and block. Cut four pieces of ¼" dowel stock to 2½" long. Glue the dowels in the holes just drilled and where shown on the Hanger Assembly drawing. Later, trim the ends of the dowels flush with the outside edges of the crossarms.

Finish the parts, and add the electricals and glass

1 Stain the project if desired and add the finish. (See the Buying Guide at the end of the article for the outdoor finish we used.)

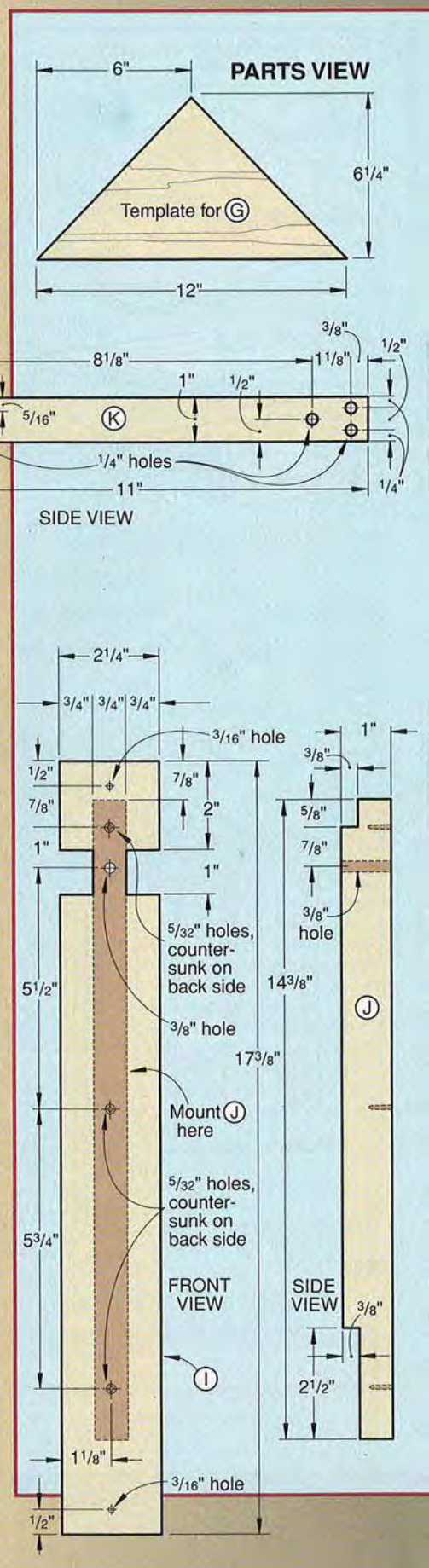
2 Have four pieces of stained glass cut to fit the rabbeted openings (we bought a glass called Kokomo 11ML at a local stained-glass store). Fit the glass panels into the openings, and secure them to the frames with clear silicone sealant.

3 Drill the pilot holes, and thread a #10 brass screw eye into the roof and hanger block where shown on the Section View drawing. Cut the brass-plated chain to length, and connect the chain to the screw eyes.

4 Drill a wire-access hole through the roof where shown on the Section View drawing. Fasten a ½x4"-diameter ceiling pan to the roof block (H). Connect a #16/2 insulated wire to the keyless porcelain socket, and run the opposite end of the wire through the hole in the ceiling pan, roof, and bracket. Connect the porcelain socket to the ceiling pan. Secure the wire by tightening the screws in the Romex connector at the ceiling pan.

5 Connect the insulated wire from the light fixture to the wire from your house. Screw the hanger assembly to the wall. Fill the gap around the wire in the roof with silicone sealant. Screw a 60-watt bulb into the socket and give your new light a try.

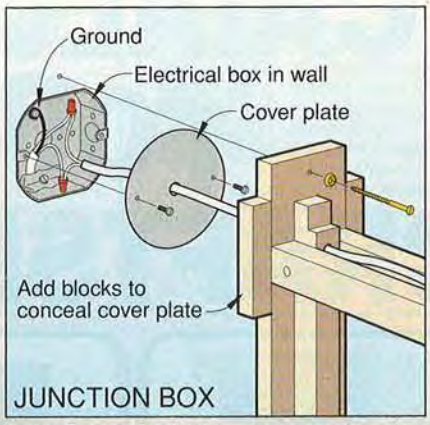
Produced by Marlen Kemmet. Project Design: James R. Downing; Marlen Kemmet
Photographs: John Hetherington
Illustrations: Kim Downing

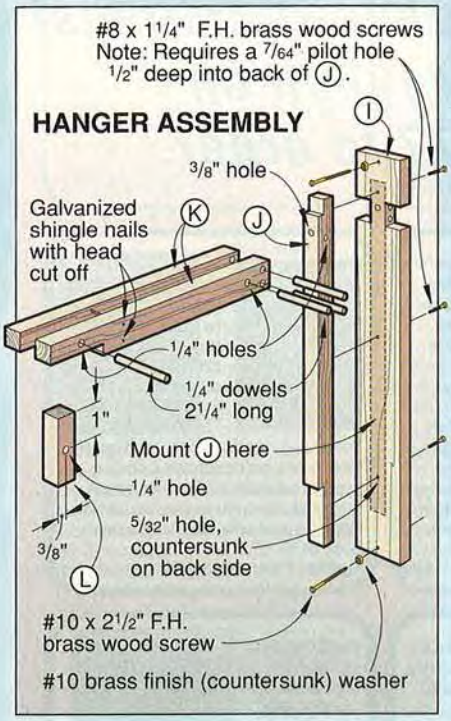


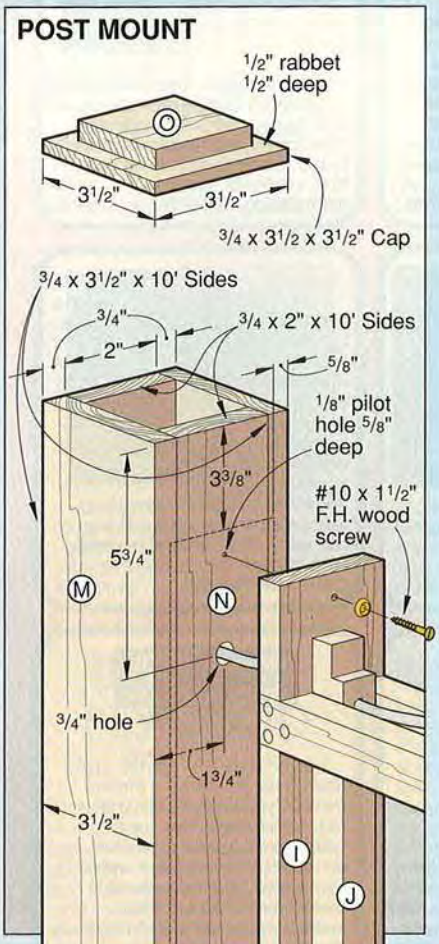
Junction box

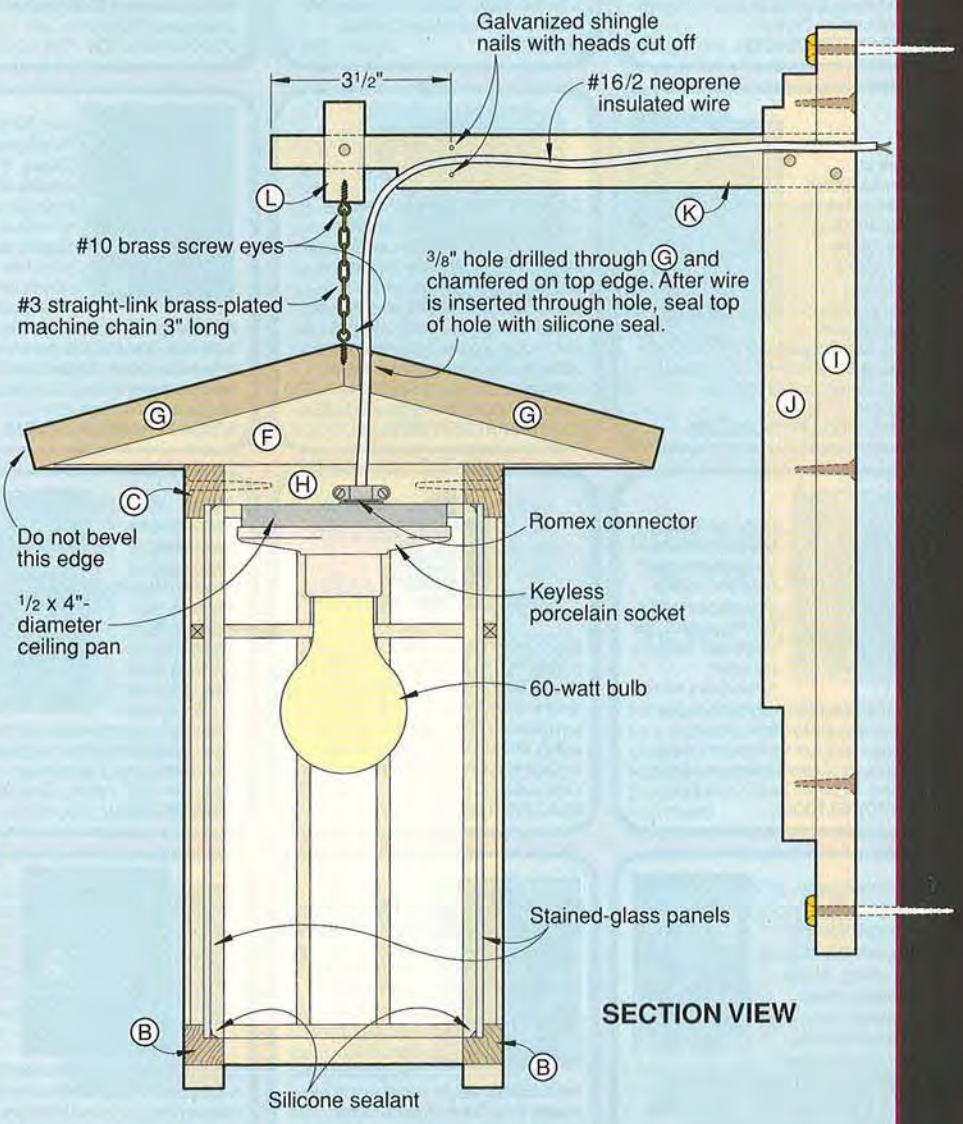
If you intend to mount your light directly to your house and over a switch-operated junction box, drill a hole in the center of the cover plate, run wire through it, make the connections, and screw the plate to the junction box where shown on the Junction Box drawing. Screw the light to the wall, and then cut and add a pair of blocks for each side of the upright to hide the cover plate.

See the Post Mount drawing for details on hanging the lantern from a post. Check local codes for depth to bury the wire and post bottom. To make the post, we bought 10′ boards, and buried the bottom end of the post 30″ in the ground.









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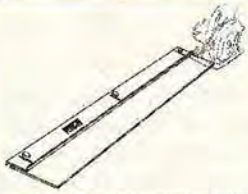

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PACE-EDWARDS CO.

A great finish for outdoor projects

After installing two Honduras-mahogany entrance doors and trim on my home, I went looking for a protective outdoor finish that would allow the natural beauty of the wood to show. My search led me to the Sikkens Woodfinish System from Akzo Coatings, a Dutch manufacturer. It's just what I was searching for.

The system consists of two products: Cetol 1, a basecoat that you apply in one application, and Cetol 23 Plus, a topcoat that you apply in two coats. Used together, these products offer many advantages over other translucent outdoor finishes such as stains, oils, or spar varnishes.

Unlike an opaque paint, translucent finishes do not have high percentages of solids for blocking ultraviolet (UV) rays contained in sunlight. These rays combine with other outdoor elements, such as rain, to eventually break down a finish. The best you can hope for in a translucent finish is that it protects and beautifies a surface for a reasonable amount of time. And, you should be able to reapply the finish with a minimum of fuss. In these respects, the Sikkens Woodfinish System excels.

Depending on the amount of sunshine striking your project, the Sikkens finish should hold up for 2 to 5 years. When it starts to wear out, you just apply another coat of Cetol 23 Plus.

Before trying the products myself, I spoke with Brent Manley, a professional signmaker in Brainerd, Minnesota. Here's what he had to say:

"We've used just about everything, and nothing holds up better and looks better than the Sikkens Woodfinish System. It builds up more than oils, but doesn't become brittle and flake off like a spar varnish."

Tested by Marlen Kemmet

Sikkens Woodfinish System, available in nine translucent, semi-gloss tones. Retail prices: Cetol 1, $13.50/quart, $40.50/gallon; Cetol 23 Plus, $15.50/quart, $45.50/gallon. For the U.S. dealer nearest you, call Akzo Coatings at 800/833-7288. In Canada call 800/663-6273.

Continued on page 80

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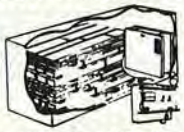

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Continued from page 78

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Continued from page 80

One tough sandpaper

Looking for one of the toughest sandpapers around? Then you might want to try a product I recently tested called European Industrial Quality abrasive cloth—one of the most expensive sandpapers on the market. Sold by Minuteman, Inc., (a distributor of furniture-refinishing supplies), the bright-yellow abrasive comes in 5"-wide, cloth-backed rolls in coarse, medium, or fine grits.

I sanded over 400 square feet of red-oak surface with a single piece of abrasive in my ½-sheet finish sander, and the abrasive wasn't close to wearing out or loading up. Unlike paper-backed abrasives that tend to tear when used in finishing sanders, this product never ripped during my tests. So, I saved myself time because I didn't have to stop and change the abrasive.

I would like to see the product come in 4½"-wide rolls. When flush-sanding into corners, I had to cut ½" off the width of the abrasive so it wouldn't extend past the edges of my sander's pad.

Depending on how much of the abrasive you buy, the cost varies from about $1.37 to $1.70 per lineal foot—pretty steep compared to Taiwanese-made, cloth-backed abrasives that cost half as much. But is the cost worth it? Yes—if you do a lot of finish-sanding and would benefit from the time savings of few-and-far-between abrasive changes.

—Tested by Chuck Hedlund

European Industrial Quality abrasive cloth, $16.95 for a 5" × 10' roll in coarse, medium, or fine grits. Thirty-foot rolls cost $42.49, and you save by buying 2 or more rolls. Prices do not include shipping. Minuteman, Inc., 115 N. Monroe, Waterloo, WI 53594. Call 800/733-1776.

Continued on page 84

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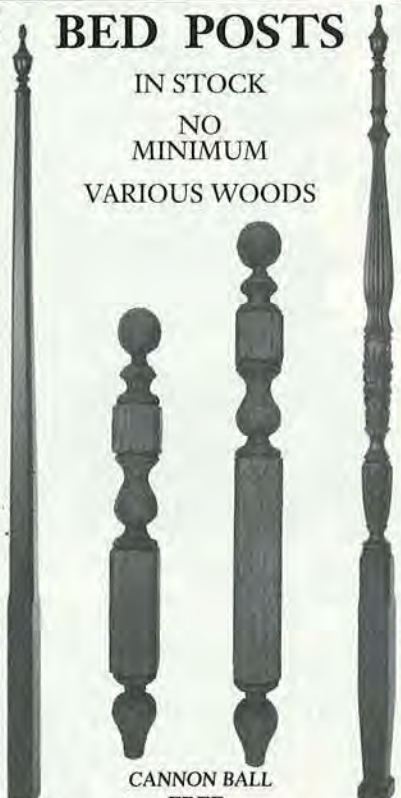

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PRODUCTS THAT PERFORM

SHOP TESTED

Continued from page 83

A polyurethane finish that really delivers

In the *WOOD*® magazine shop, we've tried nearly every polyurethane on the market, with good and bad results. Then, we tried Minwax Fast-Drying Polyurethane and haven't used another brand since. Here's why.

In our shop we move projects right along, and slow-drying polyurethanes not only throw a wrench into our schedule, they also tend to pick up dust. But because of the Minwax product's fast-drying properties, we can apply two coats in a single day under normal conditions. (Typically, we apply two gloss coats, and a semi-gloss topcoat, in a two-day time span. Then, we allow the finish to cure hard for three days.)

Once the product dries, we find few, if any, bubble marks. Even if the finish has loads of bubbles in it during application, they disappear before the product sets up.

—Tested by Jim Boelling

Minwax Fast-Drying Polyurethane. We paid less than $10 for a quart. You'll find the product widely available at hardware outlets and department stores.

How to get straight cuts in plywood every time

Most of us have to use a portable circular saw or router to cut large sheets of plywood down to size, or to cut a dado or groove into their surfaces. But, getting straight, accurate results with these tools can be a challenge. The Plymate Saw Guide by Olive Knot Products helps take the challenge out of these jobs.

The product consists of an extruded-aluminum straightedge mounted to a ¼"-thick hardboard base with screws and knobs. After purchasing the product, you trim the hardboard base with your router or saw. Now, you simply align the guide's trimmed edge with the cutoff marks on your plywood for perfect results.

On the pages of this magazine, we've shown you how to make a similar, low-cost jig out of wood (October 1991, *page 46*), but the Plymate tops this home-made solution in two ways. First, the aluminum straightedge won't warp. And second, by loosening the Plymate's knobs, you can adjust its straightedge in and out. You'll find this useful when changing between router bits of different diameters, or switching saw blades of different kerf thickness.

You can buy the product in 48" or 96" lengths. These work fine, but the products would be even better if they were 52" and 100" long, respectively. That way, 2" of the guide would extend past both edges of either a 4' or 8' sheet of plywood, making it easier for you to enter and exit a cut.

—Tested by Bob McFarlin

Plymate Saw Guide, $33.95 for 4' model, and $53.95 for 8' model. Call for shipping charges. Olive Knot Products, P.O. Box 188, 1409 North St., Corning, CA 96021. Call 800/759-6283.

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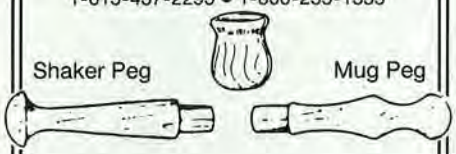

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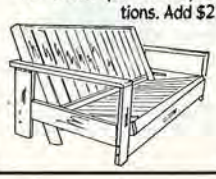

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WOOD ANECDOTE

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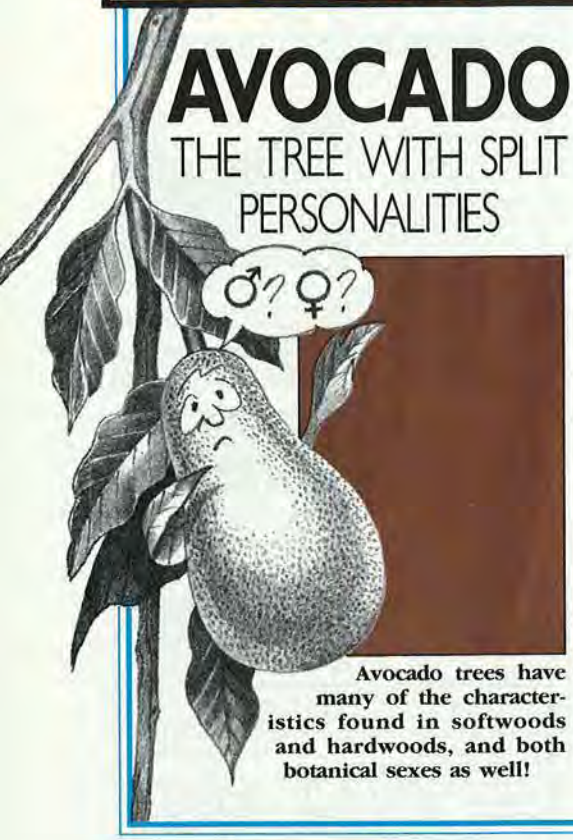
AVOCADO
THE TREE WITH SPLIT PERSONALITIES



Avocado trees have many of the characteristics found in softwoods and hardwoods, and both botanical sexes as well!

Who hasn't attempted to sprout an avocado seed and nurture it to maturity? Unless you happen to live in a region of consistent tropical warmth—or you have a green thumb—it's doubtful that your would-be tree ever reached its mature size of 20–30′. If it did, you would have witnessed fascinating dichotomies.

To begin with, the avocado botanically classifies as a fruit, although we think of it as a vegetable. And, while most plants produce flowers that are either male, female, or both at once, the avocado's blooms begin as male in the morning, and then turn female in the afternoon!

If its dual gender doesn't present enough confusion, botanists also classify the avocado (*Persea americana*) as deciduous *and* evergreen. That's because the avocado sheds its leaves once a year like a hardwood—but not until the season's new crop of leaves emerge. Therefore, like a conifer, the tree appears always green.

A cousin to the camphor tree (providing both cinnamon and camphor), as well as the sassafras, bay laurel, and nutmeg, the avocado bears fruit at various intervals, thereby producing a continual supply. In fact, a healthy, adult avocado tree may produce up to 500 fruits annually during its 50-year lifetime. But when a tree ceases to bear fruit, its rather ugly, grayish-brown wood normally does not begin another useful life as woodworking stock. True, avocado was once tested and found to be an excellent replacement for spruce in guitar and violin sounding boards, but the supply was irregular and limited. So now only local carvers benefit from the easily worked wood.

Illustration: Jim Stevenson

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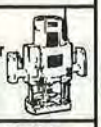

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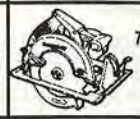

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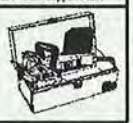

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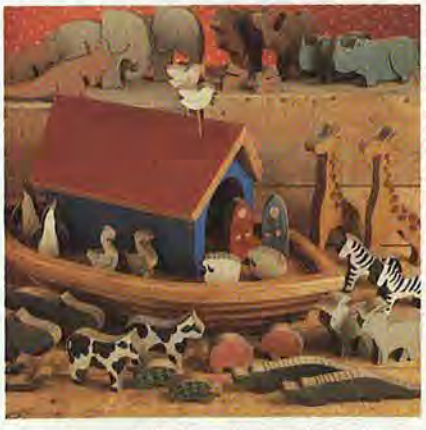

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Wood screws had been in common use for about 100 years by 1868. And for roughly the same length of time, carpenters had been hoping for some less tiresome way to drive them in.

So, the patent issued that year to Isaac Allard, a Belfast, Maine, watchmaker, should have been good news for wrist-weary woodworkers. Allard appropriated the principle of the Archimedean drill—employing a spiral-threaded shaft to convert a downward push to rotary motion—and applied it to the task of driving screws.

That spiral screwdriver didn't create much of a stir, though. In fact, it apparently never went on sale, due to design shortcomings.

In 1874, Allard joined with Belfast machinist F.A. Howard to bring an improved version to market (*top* center). Generally considered the first spiral screwdriver, it was an immediate hit.

The Allard/Howard model was surprisingly sophisticated. A clutch disengaged the drive to enable the user to pull the handle back easily for the next stroke.

Philadelphian A.H. Reid patented another popular type (*center* right) in 1882. Reid incorporated a freewheeling liner into the handle of his for easy pullback.

Another well-received style in the late 1880s came from the Decatur Coffin Co. of Decatur, Illinois, (*top* right). Also known as the Eureka screwdriver, it differed from others of the era in having the spiral thread milled on the inside of the brass housing rather than the blade shank.

Since undertakers didn't need to remove screws once they drove them into coffin lids, wags explained, the Decatur Coffin Co. offered only a right-handed screwdriver. In fact, nobody then made a reversing model that could drive and remove screws.

Spiral screwdrivers revolutionized woodworking in the 19th century. That historic importance and attractive prices (many currently sell for less than $20) make them ideal for any tool collection—or a great starting point for one.

But in 1892, F.A. Howard brought out a bi-directional screwdriver under the Jones patent (*above* left). To reverse it, the user simply slid a brass ring up or down the barrel.

The North Brothers Manufacturing Co. of Philadelphia introduced the spiral Yankee in 1897. Despite arriving rather late in the game, the name has become nearly synonymous with spiral screwdrivers. (Stanley Works bought the line in 1946.)

Charles Strellinger, a leading hardware dealer in the 19th century, noted that the spiral screwdriver was "among the most wonderful labor-saving tools ever invented . . . an entire revolution." And woodworkers willingly paid a premium price to join the revolution. At the turn of the century, Sears, Roebuck & Co. offered standard screwdrivers at prices from 4¢ (two-inch blade, beechwood handle) to 45¢ (10-inch polished blade, dyed rosewood handle).

A drive-only spiral screwdriver cost considerably more—82¢. And Sears' top-of-the-line model, the reversible Yankee, listed at $1.14. Even so, the dozens of models on the market eased work and increased productivity so much that they represented terrific value.

Still a great buy today

Collectors admire old spiral screwdrivers today because they show "the creative and innovative mind of the late 19th century inventors," says collector Cliff Fales of Lakewood, Colorado. But there's another reason to appreciate them: price. "They are mostly quite modestly priced, relative to many antique tools," Cliff says.

Decatur Coffin models, among others, often sell in the $5–$15 range, while the Howard/Allard, Howard/Jones, and Reid screwdrivers go for $20–$30. At those prices, early spiral screwdrivers are as good a buy today as they were a century ago.

Tools from the collection of C.D. Fales, Lakewood, Colo.
Photographs: John Hetherington

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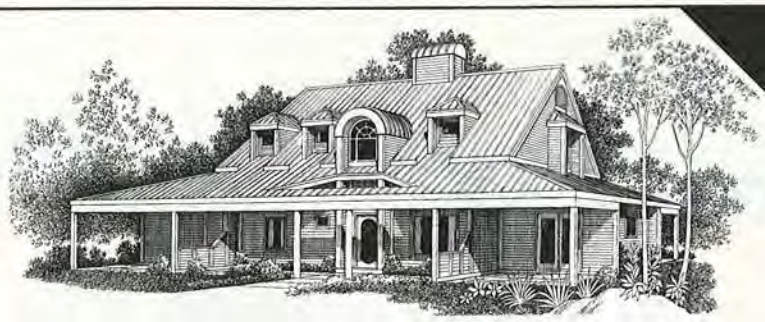

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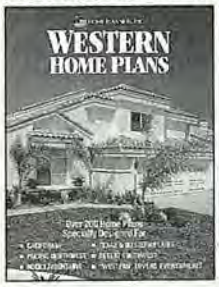

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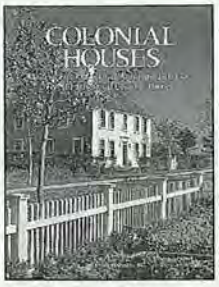

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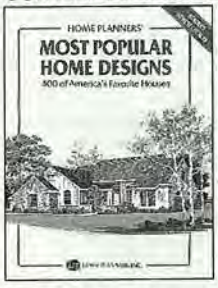

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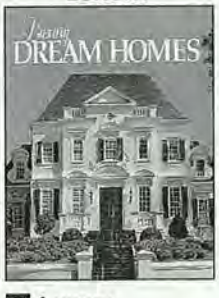

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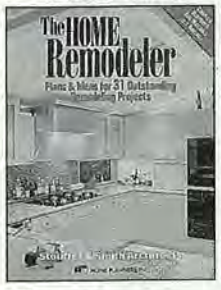

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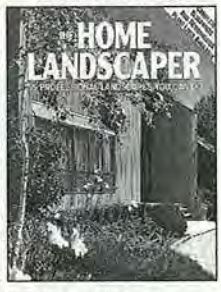

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Model	Description	List	Sale
23-700	Wet/Dry Grinder	234	168
23-680	6" Bench Grinder 1/4 HP	86	75
23-880	8" Bench Grinder 1/2 HP	151	115
11-950	8" Drill Press	199	144
31-050	1" Belt sander 2.0 amp	104	78
31-460	4" Belt/Disc Sander	198	135
31-340	1" Belt/8" Disc Sander	268	195
31-080	1" Belt/5" Disc Sander	134	94
40-560	16" 2 speed Scroll Saw	266	188
11-990	12" Bench Drill Press	276	224
11-090	32" Radial Bench Drill Press	399	294
43-355	3/4" Shaper 1-1/2 HP	964	709
43-505	1/2" Bench Router/Shaper	399	279
22-540	12" Bench Top Planer	595	398
36-220	10" Compound Mitre Saw	350	239
28-180	Bench Band Saw	232	165
40-640	20" Bench Scroll Saw	466	316
37-070	NEW 6" w/spd Bench Jointer	330	255
23-675	NEW 6" Grndr/3x24Belt Sndr	141	105
14-600	Hollow Chisel Mortiser	668	448
46-700	12" Wood Lathe	548	459
34-761	10" Unisaw 1-1/2 HP	1715	1450
	Unisaw has $100 rebate-price is before rebate		
33-990	10" Radial Arm Saw	818	625
37-280	6" Motorized Jointer	488	399
50-179	3/4 HP 2 stage Dust Collector	483	335
70-200	20" Floor Drill Press	1049	835
33-055	8-1/4" Sawbuck comp w/legs	865	595
34-330	8-1/4" Table Saw 13A	343	234
32-100	Station Plate Jointer	645	258
36-040	8-1/4" Compound Mitre Saw	224	165
34-915	30" Unifence	385	239
34-897	50" Delta Unifence	525	285
36-755	10" Tilt Arbor Saw	1264	950
34-444	Contractors Table Saw	850	615
17-900	16-1/2" Floor Drill Press	495	399
40-601	18" Scroll Saw with stand	942	760
22-662	13" Planer complete - 2HP	1499	1229
33-060	NEW "Sidekick" Miter Saw	499	368
14-070	NEW 14" Floor Drill Press	450	345
50-075	Dust Collector/Sweeper 3/4 HP	360	245
28-283	14" Band Saw w/enc. stand	910	739
34-445	34-444 Saw w/30" Unifence	1200	789
37-154	DJ15 6"Jointer w/3/4HPmotor	1420	1160

MILWAUKEE TOOLS

6527	NEW Sawzall with case	299	164
6528	above Sawzall w/wired cord	295	164
6125	NEW 5"Random Orbit Sander	200	119
6126	NEW 6"Random Orbit Sander	205	125
0399-1	12V cordless Drill Kit comp	304	165
0402-1	above Drill w/keyless chuck	309	168
0395-1	9.6V cordless Drill with case	284	158
0224-1	3/8" Drill 4.5 amp magnum	203	114
0234-1	1/2" Drill 4.5A mag 0-850 rpm	223	119
0244-1	1/2" Drill 4.5A mag 0-600 rpm	223	119
0222-1	3/8" Drill 3.5 amp 0-1000 rpm	189	107
0228-1	3/8" Drill 3.5 amp 0-1000 rpm	183	100
0375-1	3/8" close quarter Drill	223	127
0379-1	1/2" close quarter Drill	254	145
6539-1	cdls Screwdriver 190 rpm	127	75
6546-1	cdls Scrwdvr 200 & 400 rpm	138	82
5399	1/2" D-hdle Hammer Drill Kit	319	184
6750-1	Drywall Gun 0-4000 5 amp	162	93
6507	Original SawZall with case	249	138
6014	Orbital Sander 1/2 sheet	214	119
8977	variable temp. Heat Gun	122	74
5397-1	3.8" var. spd Hammer Drill Kit	244	138
5371-1	1/2" var. spd Hammer Drill Kit	335	185
5377-1	5371-1 w/keyless chuck	335	185
3107-1	1/2" v/spd right angle Drill Kit	370	204
6754-1	Drywall Gun 0-4000 5.4 amp	192	106
3300-1	1/2" var. spd right angle Drill	329	184
5680	Router 2 HP - 12 amp	355	198
0235-1	1/2" Drill w/keyless chuck	223	125
6145	4-1/2" Grinder 10,000 rpm	162	98
6142	6145 with case & accessories	199	129
6749-1	Drywall Gun 0-2500 5.4 amp	224	122
6365	7-1/4" Circular Saw 13 amp	214	122
6366	6365 w/fence & carbide blade	224	127
6368	6365 w/fnce,carb. blde,& cse	244	139
6369	New 7-1/4 Circ saw w/brake	245	149
6377	7-1/4" Worm Drive Saw	324	178
6256	Top Handle Jig Saw	220	142
6490	10" Mitre Saw	444	269

FREUD CARBIDE TIPPED SAW BLADES
5/8" Bore - Industrial Grade

Item	Description	Teeth	List	Sale
LU72M010	Gen Pur. A.T.B.	10" 40	67	39
LU82M010	Cut-off	10" 60	90	49
LU84M011	Comb	10" 50	76	40
LU85M010	Super Cut-off	10" 80	112	59
LM72M010	Ripping	10" 24	66	39
LU73M010	Cut off	10" 60	82	45
LU87M010	Thin Kerf	10" 24	70	39
LU88M010	Thin Kerf	10" 60	86	46
LU98M010	Ultimate	10" 60	125	65
LU91M010	Compnd Mitre	10" 60	60	54
TK206	10° Framing	24	38	25
TK303	7-1/4" Finishing	40	37	22
TK306	10° Finishing	40	46	25
TK906	10° Combo	50	52	29
SD306	6" Dado - Carbide		215	112
SD308	8" Dado - Carbide		229	119
F0	1-3/4" x 5/8" Biscuit 1000 Qty		32	29
F10	2-1/8" x 3/4" Biscuit 1000 Qty		32	29
F20	2-3/4" x 1" Biscuit 1000 Qty		34	29
FA	Assorted Biscuits 1000 Qty		34	29
FB100	16 piece Forstner Bit Set		331	179
94-100	5 pc. Router Bit Door System		319	159

The following FREUD Tools have a $30.00 rebate!
Price shown is before rebate - Expires 6/30/93

FT2000E	3-1/4 HP v/spd Plunge Router	410	199
JS100	Biscuit Jointer with case	334	162

MAKITA TOOLS

Model	Description	List	Sale
6070DW	3/8" v/spd Reverse Drill 7.2V	124	74
6071DWK	above Drill w/removable batt.	194	108
5090DW	3-3/8" Saw Kit 9.6 volt	250	138
6010SDW	3/8" cordless Drill Kit 7.2V	96	59
ML900	Incandescent Flashlight 9.6V	Sale	37
6012HDW	2 speed Drill w/clutch-comp	243	129
6092DW	v/spd Drill kit - no clutch	257	134
6093DW	v/spd Drill w/clutch-complete	261	139
6093DWE	6093DW Drill Kit w/2 batteries	270	145
6095DW	6093DW Kit w/keyless chuck	278	135
6095DWE	6095DW Drill Kit w/2 batteries	270	148
6011DW	NEW 12V Drill Kit complete	320	175
632007-4	9.6 volt Battery	47	30
632002-4	7.2 volt Battery	39	28
5007NBA	7-1/4" Saw w/electric brake	243	125
5008NBA	8-1/4" Saw w/electric brake	301	163
B04510	1/4 sheet Pad Sander	93	54
9900B	3" x 21" Belt Sander w/bag	283	149
9924DB	3" x 24" Belt Sander w/bag	299	159
4301BV	Orb. var. spd Jig Saw 3.5A	262	142
JR3000V	var. speed Recip Saw w/case	239	125
LS1020	10" Mitre Saw 3.5 amp	571	299
9820-2	Blade Sharpener	394	194
1900BW	3-3/4" Planer with case	221	116
1911B	4-3/8" Planer 7.5 amp	255	139
9207SPC	7" Sander/Polisher	294	159
9514B	4" Disc Grinder 4.6 amp	100	65
3601B	1-3/8 HP Router	261	139
B04550	1/4 sheet Pad Sander w/bag	91	54
DA3000R	3/8" Angle Drill	285	149
2708W	8-1/4" Table Saw	519	259
2711	10" Table Saw with brake	868	485
6404	3/8" Drill Rev. 0-2100 rpm 2 A	105	57
6510LVR	3/8" Drill Rev. 0-1050 rpm	152	84
6820V	0-4000 rpm Drywall Gun 5.2 A	160	89
6013BR	1/2" Drill Rev. 6 amp	263	138
5402A	16" Circular Saw 12 amp	675	345
3612BR	3 HP Plunge Router	347	169
9401	4" x 24" Belt Sander w/bag	343	174
4302C	var. speed Orbital Jig Saw	283	189
5077B	7-1/4" Hypoid Saw	260	138
LS1030	NEW 10" Mitre Saw	428	195
5007NB	7-1/4" Circular Saw 13 amp	214	116
2012	12" Portable Planer	913	465
LS1011	10" Slide Compound Saw	859	498

SIOUX TOOLS

8030	New 3/8" var/spd Drill	238	148
8000	3/8" var/spd close qtr Drill	201	128
690	5" Air Random Orbit Sander	139	138
690VV	690 w/venturi dust collection	281	178
658	5" Air Rndm Sander-dual action	261	158

SENCO AIR NAILERS

SFN1	Finishing Nailer 1" - 2"	377	269
SFN2	Finish. Nailer 1-1/2" - 2-1/2"	571	378
SN325	Nailer 1-7/8" - 3-1/4"	665	435
SN4	General purpose 2" - 3-1/2"	685	468
SLP20	New Pinner w/cse 5/8" - 1-5/8"	399	269
SKS	Stapler 5/8" - 1-1/2"	355	245
N70	NEW HD Framer 2" - 3-1/2"	625	479

BOSTITCH AIR NAILERS

N80S-1	Stick Nailer	Super Sale	355
N12B-1	Coil Roofing Nailer	845	399
N60FN-2	Finishing Nailer	625	355
T31	Brad Nailer	270	145
CWC100	1 HP Pancake Compressor	445	289

EXCALIBUR Fences & Tables

TT45R24L9	24" Fence	369	299
TT45R50L12	50" Fence	399	318
EXSLT30	Sliding Table	599	475
EXSLT60	Sliding Table	745	585

SKIL SIZZLERS

77	7-1/4" Worm Drive Saw	230	144
2735-04	12 volt cordless Drill Kit	210	132
2735-04X	2735-04 with keyless chuck	235	135
1605-02	NEW Biscuit Jointer w/case	200	128
3400	10" Table Saw - Bench Top	250	179
3330	16" Scroll Saw - Bench Top	200	135

PANASONIC CORDLESS

EY6205BC	NEW variable speed 12 volt Drill w/15 minute charger & case	390	179
EY6281BC	NEW variable speed 9.6 volt Drill w/15 minute charger & case	350	168
EY571BC	EY571B with case & 2 batt	275	155
EY6207BC	NEW 12 volt 1/2" Drill w/keyless chuck var. speed w/15 minute charger & case	421	218
EY6205EQK	Same as EY6205BC but battery has 40% more life & 20% more torque	368	189

PASLODE IMPULSE GUNS

IM250	Trimpulse Finish Nailer Kit	849	615
IM325	Impulse Framing Nailer Kit	849	615

HITACHI TOOLS

C7BD	7-1/4" Circular Saw with brake	230	118
M12V	NEW 3 HP var. speed Router	447	225
TR12	Plunge Router 3 HP	354	169
F1000A	12" Planer/6" Jointer	2835	1549
C10FA	10" Deluxe Mitre Saw	538	268
C12FA	NEW 12" Mitre Saw	632	298
C8FB	8-1/2" Slide Compound Saw	899	449
FREUD LU91M008	8-1/2" Carb bld 48 t	68	43
C15FB	15" Mitre Saw	745	395
FREUD LU85M015	15"c/bld 108 tooth	180	99

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DEWALT TOOLS

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DW945K	3/8" 12V cdls Drill Kit w/2 batt.		284	169
DW944K	3/8" 9.6V cdls Drill Kit w/2 batt		264	149
DW610	1-1/2 HP 2 handle Router		250	152
DW411	1/4 sheet Palm Sander, 1.7 amp.		87	58
DW1003	3/8" Drill, 4 amp,0-2500 rpm,rev		110	68
DW510K	1/2" v/spd Hammer Drill w/case		298	165
DW682K	Biscuit Joiner w/cs & 75 biscuits		428	225
DW705	12" Cmpd Mitre Saw w/dust bag		583	355
DW615	NEW 1-1/4 HP Elect. Plge Router		290	165
DW625	NEW 3 HP Electronic Plge Router		500	279
DW675K	NEW 3-1/8" Planer with case		280	165
DW431	NEW 3 x 21 v/spd Belt Sander		320	184

PORTA NAILER

401	Porta Nailer complete	265	198
501	Face Nailer complete	265	195

WERNER LADDERS

6204	4' Fiberglass	179	65
6205	5' Fiberglass	199	75

SUMMER KIT SPECIALS

9852K	Porter Cable 9852 Drill Kit w/extra batt	185
9853K	Porter Cable 9853 Drill Kit w/extra batt	175
7335K	Porter Cable 5" var. spd Random Orbit Sndr w/cse & 1 roll 100X & 150X discs	273 159
7336K	Porter Cable 6" var. spd Random Orbit Sndr w/cse & 1 roll 100X & 150X discs	278 165
555K	Porter Cable Plate Biscuit Jointer with case & 1000 assorted biscuits	339 195
JS100K	Freud Jointer w/cs & 1000 biscuits	351 188
1581VSK	Bosch Top Handle Jig Saw with case & 30 Bosch blades	305 188
1582VSK	Bosch CLIC Barrell Grip Jig Saw with case & 30 Bosch blades	305 188
JM100KK	Ryobi Joiner w/1000 biscuits	475 238

BIESMEYER FENCES

B-50	50" Commer. Saw Fence	329	294
T-SQUARE 52	52" Homeshop Fence	249	234
T-SQUARE 40	40" Homeshop Fence	242	208
T-SQUARE 28	28" Homeshop Fence	230	198

WEDGE SMART LEVEL

SM-PR2	2 FT Level with sensor	120	88
SM-PR4	4 FT Level with sensor	150	105
SM-PR6	78" Level with sensor	180	139
SERIES200	NEW 2FT Level with sensor		55

Msx636 FEIN	Triangle Sander Kit	Sale	195
LPN672 PONY	Air Palm Nailer w/glove	Sale	94.99

JORGENSEN ADJUSTABLE HANDSCREWS

Item#	Jaw Length	Open Cap	List	Sale	Box of 6
#0	8"	4-1/2"	19.00	11.89	61.00
#1	10"	6"	21.76	12.89	70.65
#2	12"	8-1/2"	24.95	14.95	80.95
#3	14"	10"	31.61	18.95	104.95
#4	16"	12"	42.30	24.95	143.95

JORGENSEN STYLE 37 2-1/2" Throat 1/4"x3/4"

Item#	Jaw Length	List	Sale	Box of 6
3706	6"	9.86	6.25	34.75
3712	12"	10.92	6.75	37.75
3718	18"	12.05	7.25	40.75
3724	24"	13.16	8.19	43.75
3730	30"	14.70	9.10	49.75
3736	36"	16.05	10.19	55.75

PONY CLAMP FIXTURES

Model		List	Sale	Lots of 12
50	3/4" Black Pipe Clamps	13.61	7.89	84.99
52	1/2" Black Pipe Clamps	11.37	6.50	69.50

BOSCH

1581VS	Top Handle Jig Saw	265	142
1582VSC	NEW CLIC Barrell Jig Saw	265	142
	Bosch Metal Case for above Jig Saws	34	32
	Bosch 30 blade assortment for Jig Saws		27.99
1942	Heat Gun 600° - 900°	111	75
1272D	3" x 24" Belt Sander with bag.	329	184
1273D	4" x 24" Belt Sander with bag.	345	194
11-212VSR	Bulldog 3/4"SDS Rtry Drill	370	198
1347AK	4-1/2" Grinder w/case & access.	170	108
1348AE	5" Grinder 8.5 amp	195	118
1194VSR	1/2" var. speed Hammer Drill	264	145
1194VSRK	above Hammer Drill w/case.	292	179
1608	5.6 amp Laminate Trimmer	149	89
1609K	Lam Installers Kit with 1609	309	175
1609KX	Deluxe Installers kit	361	209
1604	1-3/4 HP 2 Handle Router	236	137
1604K	same as above w/cse & acc	287	169
1606	1-3/4 HP D-handle Router	273	168
3258	3-1/4" Planer w/blade guard	239	139
3258K	3258 Planer with steel case	265	154
3270D	3" x 21" Belt Sander with bag.	260	148
1273DVS	var. spd 4" x 24" Belt Sander	370	198
1614	NEW 1HP Plunge Router	220	128
1614EVS	NEW 1-1/4HP v/spd Plge Rtr.	255	149
1613	NEW 1-3/4 HP Plunge Router	286	164
1613EVS	NEW 2HP v/sp Plunge Router	320	184
1615	NEW 3 HP, Plunge Router	395	228
1615EVS	NEW 3 HP v/spd Plge Router	460	244
1632VSR	Recip Saw 8.4A orb-v/spd	225	148
3050VSR	9.6V cdls v/sp Drill Kit comp	256	138
3051VSR	K3050VSR w/keyless chuck	256	145
1370DEVS	6" Random Orbit Sander	481	219
3283DVS	5" Random Orbit Sander	159	98
3283DVSK	3283DVS Kit complete	220	119

ELU BY BLACK & DECKER

Model	Description	List	Sale
3338	2-1/4 HP v/spd Plunge Router	427	255
3375	3-1/8" Univ. planer 7.2 amp	313	155
3380	Biscuit jointer with case	542	248
4024	3 x 21 var. speed Belt Sander	322	179

BLACK & DECKER

1166	3/8" Drill 0-2500 rpm 4 amp	100	65
1703-1	10" Mitre Saw w/73-770 blde	313	185
4011	1/4 sheet Palm Sander	82	59
79-034	Workmate 400	175	109
2694	7-1/4" Super Saw cat w/case	248	139
2695	8-1/4" Super Saw cat w/case	271	153

DAVID WHITE

LP6-20	Sight Level package - 20x	310	198
L6-20	Meridian Level - 20x	290	185
LT8-300	Level Transit - 26x	650	445
LT8-300P	above Level w/optical plum	769	519
LT6-900	Level Transit - 20x	389	245
ALT6-900	Automatic Level - Transit - 18x	549	385
ALTP6-900	above Level w/tripod & rod	600	438
ALP6-18HD	above Level w/tripod & rod	550	369

RYOBI SPECIALS

JP-155	6-1/8" Jointer/Planer	611	305
TS-254	NEW 10" Mitre Saw	397	199
TS-254K	above Saw with acc. kit & B&D 73-770 carbide blade	495	249
AP10	10" Surface Planer 13 amp	820	355
RE600	3 HP Plunge Router	431	209
BE321	3" x 21" var. spd Belt Sander	272	138
TFD220VRK	12V cordless Drill Kit	325	172
JM100K	NEW Biscuit Jointer w/case	431	215
BT3000	NEW 10" Table Saw	699	545
TSS220	NEW 8-1/2" Slide Comp. Saw	790	445
DS1000	NEW Detail Sander	80	55
RS112	NEW Palm grip Rndm Orb Sndr	80	59
AP12	NEW 12" Bench Planer	840	425

LAMELLO BISCUIT JOINTERS

TOP 10	"Simply the Best"	699	559
STANDARD 10	"Professionals Choice"	499	399
COBRA	NEW Biscuit Joiner	Special	299

QUAL-CRAFT PRODUCTS

2200	Pump Jack	79	58
2201	Pump Jack Brace	30	20
2203	Pump Jack guard rail holder	31	21
2204	Workbench & rail holder combo	53	39
	Buy any 6 (can be assort.) deduct 10%		
2601	Wall Jack	167	114
	Lots of 4 deduct additional 10%		

PORTER CABLE

690	1-1/2 HP Router 8 amp	240	134
9690	690 Router with steel case	305	149
691	1-1/2 HP Router D-handle	260	142
695	1-1/2 HP Router/Shaper	335	209
696	HD Shaper Table	185	125
351	3" x 21" Belt Sander w/o bag	245	142
352	3" x 21" Belt Sander with bag.	255	149
360	3" x 24" Belt Sander with bag.	330	185
361	3" x 24" Belt Sander w/o bag	310	175
362	4" x 24" Belt Sander with bag.	345	193
363	4" x 24" Belt Sander w/o bag	330	185
315-1	7-1/4" Top Hdle Circular Saw	210	118
9315-1	315-1 comp. w/cs & carb bld	240	137
617	7-1/4" Pushhandle Saw	210	119
9617	617 comp. w/cse & carb blde.	240	137
314	4-1/2" Trim Saw	240	135
97751	1/2" v/spd Hammer Drill w/cse	260	155
9629	Recip Saw var. speed 8 amp	250	144
9118	Porta Plane Kit 7 amp	360	205
505	1/2 sheet Pad Sander	210	116
6611	3/8" var. speed Drill 5.2 amp	200	118
6614	1/2" var. speed Drill 0-750 rpm	210	124
6615	7514 with keyless chuck	215	124
7549	Top handle Jig Saw 4.8 amp	250	145
330	Speed Block Sander 1/4 sheet	103	58
555	Plate Biscuit Jointer with case	315	168
345	6" Saw Boss 9 amp	180	102
9345	345 comp. w/cse & carb blde.	210	119
9647	TIGER CUB Recip. Saw	195	115
9637	Full var/spd Recip Saw 8 amp	250	138
7519	3-1/4 HP Router 2 Handle	410	228
7518	3-1/4 HP 5 speed Router	475	264
7538	3-1/4 HP Plunge Router	410	228
7399	5.6 amp Drywall Cutout Unit	140	82
7310	5.6 amp Laminate Trimmer	150	88
97310	Laminate Trimmer Kit comp	345	194
7334	5" Random Orbit Sander	210	119
7335	5" var. spd Rndm Orbit Sndr	230	129
7336	6" var. spd Rndm Orbit Sndr	235	134
73333	NEW Dust Collection system		24.50
693	1-1/2 HP Plunge Router Base	295	165
6931	Plunge Router Base	120	75
7539	3-1/4HP var/spd Plunge Router	475	259
9852	12V 3/8"Drill w/cse 0-1000rpm	270	149
9853	9852 with keyless chuck	270	149
9854	12V 1/2" Drill w/cse 0-360 rpm	280	155
8500	12V battery for above drills	Sale	39
	New Tools by Porter Cable		
9841	9.6 volt cordless Drill Kit with 15 minute charger, battery, & case	309	174
9840	9.6 volt cordless Drill Kit with 1 hour charger, 2 batteries, & case	289	164
332	Palm Grip Rndm Orbit Sander	109	64
333	above Sander with dust bag	125	74
352VS	3x21 Belt Sander w/bag v/spd	280	159
7116	24" Omni Jig	470	294
334	333 Sander with PSA pad	125	74
550	Pocket cutter with case	330	185
7700	10" "Lazerloc" Miter Saw	634	345

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CEDAR'S SUPER SERVICE

What's the best outdoor finish for western red cedar, or the most effective glue? Is there a western red cedar lumber grade that won't tax your budget? Now, you can find the answers to questions like these with a letter, call, or fax.

The Western Red Cedar Lumber Association (WRCLA) provides free information on its product. Request general literature on siding, paneling, decking, design ideas, outdoor projects, or finishing. Or, ask specific project-related questions. In the East, direct your letters to: *WRCLA, 4290 Bells Ferry Rd, Ste. 106-581, Kennesaw, GA 30144 (404/928-3318, fax 404/591-8593)*; Midwest: *WRCLA, P.O. Box 2888, Naperville, IL 60567-2888 (708/369-2828, fax 708/369-8561)*; West: *WRCLA, 1200/555 Burrard St., Vancouver, B.C. Canada V7X 1S7 (604/684-0266, fax 604/687-4930).*

Add soybeans to newspapers and what do you get?

For researchers in Mankato, Minnesota, the combo resulted in a wood, of sorts. The inventors of NewStone, a granite-hard material that mills like wood, say that 55 pounds of newspapers mixed with soybean resin yields enough "wood" for a desk with drawers.

Phenix Composites, Inc., of Mankato, markets the new material that not only recycles waste paper destined for the landfill, but proves to be a boon for farmers. And, NewStone's manufacturing process produces no toxic waste.

FRONT & CENTER
WOODWORKERS WHO MAKE A DIFFERENCE

Name: Warren J. Malak
Age: 42
Home: Wisconsin Rapids, Wisconsin
Occupation: Toymaker

Despite impaired eyesight, Warren J. Malak has produced hundreds of toys to give away, both locally and to contests such as Build-A-Toy®.

Ever since *WOOD®* magazine's Build-A-Toy® contest began, readers have written telling us how good it makes them feel to donate their creations to needy children. This year, one of those letters really stands out.

Warren J. Malak wrote to explain just what it meant to him to enter the contest. His words are eloquent. Here's part of his letter:

"I don't think I am any different than any other toymaker who, year after year, sends out his love in the form of wooden toys. I take pride in knowing that I am doing something to help.

"When I awake each morning, I need to know that this new day will bring some kind of meaning for me. Being visually impaired all of my life, I know what it means to be missing something that others may take for granted. I also know what it is to need food, housing, warmth, and love. So this is why I give my toys to your program and many other local ones. These toys may never win a contest prize because I don't make them for that reason, but they will win what I build into each one, a feeling of love, understanding, and hope. . . ."

Warren also shared a little about his life. You see, he's suffered from a degenerative eye disease since birth. Five years ago, he had to take medical retirement from his tool-repair job with Black & Decker. Since then, he's devoted most of his time to woodworking, a challenge for him.

For instance, in his "good" left eye he has 20/700 vision (20/20 is perfect), so Warren wears 10-X magnifiers when sawing. Even so, he manages to make about eight toys a week, selling some at craft fairs. But mostly he builds toys to give away.

Before Warren started making toys, he felt a bit differently about life. Depression had driven him to despair. Now, thoughts of a child's face radiating joy over a wooden toy give him a new outlook. "I feel lucky," he says. "Christmas happens every day."

Do you know a subscriber who makes a difference? Send details to: Front & Center, WOOD Magazine, 1912 Grand Ave., Des Moines, IA 50309-3379.

FREQUENT FIRES MEAN LESS FUEL

Before Europeans arrived with their culture, every acre of trees in California burned once in 20 years on the average, according to the *Forestree News*. But, due to this frequency, wildfires were less intense and less damaging than those of today because they kept down the buildup of dead material.

Photograph: Peter Maller
Illustrations: Jim Stevenson

NOW! PLANE, MOLD, SAND and SAW with

Infinitely Variable Power-Feed!

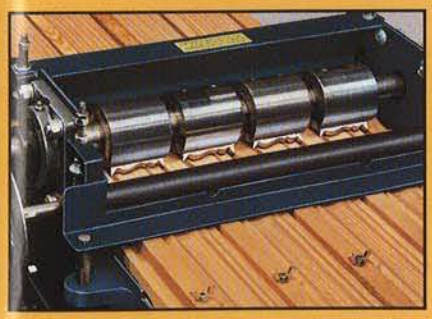
MAKES YOU MONEY... SAVES YOU MONEY!

Put this versatile power-feed tool to work in your shop . . . see how fast it pays for itself! Quickly converts low-cost rough lumber into valuable finished stock. Turns out perfect picture frame moldings, quarter-round, casing, tongue and groove . . . all popular patterns . . . any custom design.

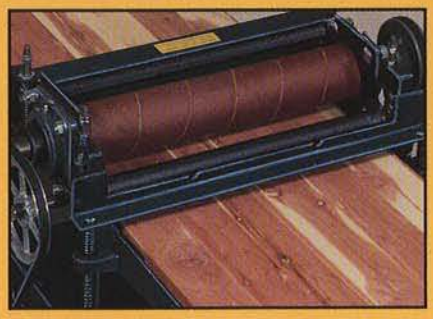
Just a twist of the dial puts twice as many cuts-per-inch at your fingertips as any comparable planer – from 70 to over 1,000 CPI! This heavy-duty machine will sail through even the toughest oak at higher speeds, or you can slow it down to handle those "hard-to-work" pieces like curly maple, knotty cedar, burls, knees and much more! A valuable feature for molding work, where profiles make sanding impossible.

Change to Molding, Sanding or Sawing in just minutes! Unique "Morse-Taper" Quick Change Cutterhead guarantees fast changeover . . . bearings remain factory set . . . precisely aligned at all times.

Now choose from three powerful models! Woodmaster introduces the first 18″ and 25″ Planer/Molders . . . with all the features that have made the 12″ model the most versatile Planer/Molder on the market! Send for Free Facts today!



Woodmaster's Quick-Change Molding Head lets you create custom moldings from any stock. Choose from over 250 standard trim and picture frame patterns . . . or design your own!



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New ripsaw attachment lets you gang-rip with power feed in a fraction of the time it takes for multiple hand-fed passes on an ordinary table saw.

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Editor, Workbench Magazine

Best Value–"After checking them all, Woodmaster was obviously the best deal for the money. Also, I would like to acknowledge the polite and prompt service."

E. D. Holtz, North Carolina

10" TABLE SAW

***EN-TB10**
- 1-1/2HP 110/220V
- CAST IRON TABLE

REG: $350.00
SPECIAL: $335.00

WOOD SHAPER

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- 1HP 16 AMPS 110V
- REVERSIBLE MOTOR
- CAST IRON TABLE
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HEAVY DUTY WOOD SHAPER

***EN-WS10**
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- 3/4"+1" SPINDLES
- 3" SPINDLE TRAVEL (1/2" SPINDLE AVAILABLE)

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SPECIAL: $845.00

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***EN-BS16**
- 1-1/2 HP 110/220V 3 SPEEDS
- CAST IRON TABLE
- RIP FENCE & MITRE GAUGE INCLUDED

REG: $520.00
SPECIAL: $490.00

18" HEAVY DUTY BAND SAW

***EN-BS18S**
PRICE: $645.00

10" HEAVY DUTY TABLE SAW

***EN-HTB10**
- 3HP 220V
- TRIPLE V BELT DRIVE, 5/8" ARBOR
- SOLID CAST IRON TABLE+WINGS
- PRECISION FENCE + MITRE GAUGE

REG: $1,190.00
SPECIAL: $1,135.00

18" SUPER HEAVY DUTY BAND SAW

***EN-BS18**
- 2HP 110/220V 11 AMPS 220V
- 3,300 FPM BLADE SPEED
- RIP FENCE & MITRE GAUGE INCLUDED

REG: $910.00
SPECIAL: $880.00

12" PLANER

EN-PN12
- 2HP 16 AMPS 110V 16,000 CPM
- 2 BLADE CUTTERHEAD
- 26.2 FPM FEED RATE

REG: $380.00
SPECIAL: $355.00

6" X 9" BELT/DISC SANDER

***EN-SN69**
- 3/4 HP 110/220 V
- 6" X 48" BELT,9" DISC
- TABLE TILTS: 0°-45°, BELT: 0°-90°
- WITH GAUGE

REG: $195.00
SPECIAL: $185.00

15" PLANER

***EN-PN15**
- 2HP 110/220V 15 AMPS 220V
- 2 SPEEDS, 13,500 CPM
- 3 BLADE CUTTERHEAD
- STAND INCLUDED

PRICE: $795.00

22" SCROLL SAW

EN-SC22
- 1/8HP MOTOR
- SINGLE SPEED 1,725 SPM
- 22" THROAT, 2" MAX CUT

REG: $150.00
SPECIAL: $145.00

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- 3 HP 220 V 22AMPS
- 1850 CFM
- INTAKE HOLES: 3 @4"

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6" JOINTER

***EN-J006**
- 1HP 110/220V 14 AMPS 110V
- CAST IRON TABLE
- 13,500 CPM
- 3 BLADE CUTTERHEAD

REG: $340.00
SPECIAL: $300.00

8" HEAVY DUTY JOINTER

***EN-J008**
REG: $675.00
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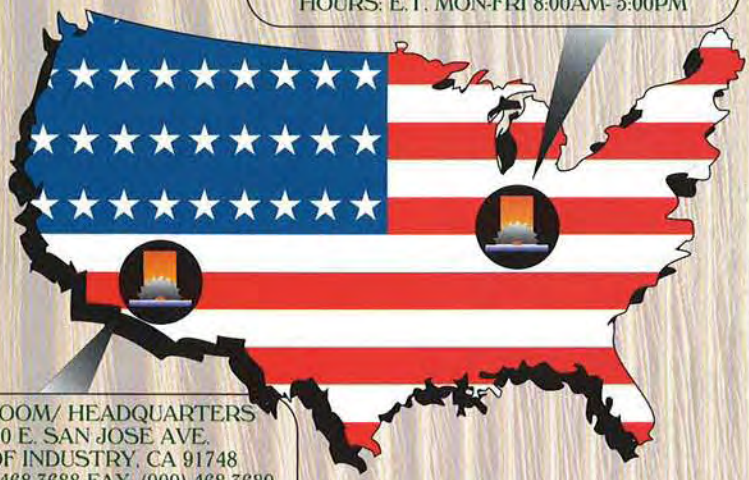

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